TGT/PGT

CHEMISTRY

Revision Book

Important Facts, Formulas & Oneliners
Chapter, Topic & Subtopic Wise

Useful for : TGT/PGT/LT-GRADE/NVS/KVS/DSSSB/GIC/GDC/Assistant Professor EMRS/AWES/DIET/AEES and Other Competitive Exam

Chief Editor
A. K. Mahajan

Written & Compiled By
YCT Expert Team
Computer Graphics by

These ebooks are free of cost, Join our telegram channel: @apna_pdf

still your suggestions and queries are welcomed.
In the event of any dispute, the Judicial area will be Prayagraj.

Search on TG: @apna_pdf

@apna_pdf

These ebooks are free of cost, Join our telegram channel: @apna_pdf

Click Here To Join our Telegram Channel

INDEX

PHYSICAL CHEMISTRY

UNIT-1: SOME BASIC CONCEPTS OF CHEMISTRY ---------- 5-14
- Uncertainty in measurement. ---------- 05
- Laws of chemical combination. ---------- 05
- Atomic and molecular masses and mole concept and molar mass, empirical and molecular formulae. ---------- 05
- Stochiometric calculation. ---------- 05

EXAM POINT 06-14

UNIT: 2- STRUCTURE OF ATOM ---------- 15-33
- Sub- atomic particles and atomic models. ---------- 15
- Development leading to the bohr's model of atom. ---------- 15
- Hydrogen atom. ---------- 15
- Towards quantum mechanical model of the atom. ---------- 16

EXAM POINT 19-33

UNIT-3: CHEMICAL THERMODYNAMICS ---------- 34-43
- Thermodynamic terms and application measurement of ΔU and ΔH calorimetry. ---------- 34
- Work done and enthalpy change ΔH of a reaction. ---------- 34
- Spontaneity, entropy Gibbs Energy change and equilibrium. ---------- 34

EXAM POINT 36-43

UNIT-4: STATES OF MATTER ---------- 44-52
- The Gas laws. ---------- 44
- Ideal gas equation ---------- 44
- Kinetic energy and molecular speeds and kinetic molecular theory of gasses. ---------- 44
- Deviation from ideal gas behavior and liquefaction of gases. ---------- 44
- Liquid states. ---------- 44

EXAM POINT 47-52

UNITE -5 EQUILIBRIUM ---------- 53-68
- Equilibrium in physical process. ---------- 53
- Law of chemical equilibrium and equilibrium constant (k) ---------- 53
- Application of equilibrium constant. ---------- 53
- Acids, Bases and salt and ionization of acids and bases, buffer solutions. ---------- 54
- Solubility equlibria of a sparingly soluble salts. ---------- 55

EXAM POINT 56-68

UNIT-6: THE SOLID STATE ---------- 69-80
- Amorphous and crystalline solids. ---------- 69
- Classification of crystalline solids. ---------- 70
- Crystal lattice, unit cell calculating, No. of atoms in a unit cell ---------- 70
- Imperfections in solids, Electrical properties and magnetic properties. ---------- 71

EXAM POINT 73-80

UNIT-7: SOLUTIONS ---------- 81-88
- Expressing concentrations of solutions, and solubility. ---------- 81
- Vapour pressure of liquid solutions. ---------- 82
- Ideal and non- ideal solutions. ---------- 82
- Colligative Properties of Determination of the molar mass ---------- 82

EXAM POINT 84-88

UNIT-8 ELECTROCHEMISTRY ---------- 89-97
- Electrochemical cells. ---------- 89
- Galvanic cell. ---------- 90
- Conductance of electrolytic solutions. ---------- 90
- Electrolytic cell and electrolysis. ---------- 90
- Batteries, fuel cell and corrosion. ---------- 91

EXAM POINT 92-97

UNIT-9: CHEMICAL KINETICS ---------- 98-108
- Rate of a chemical reaction. ---------- 98
- Factors influencing rate of reaction. ---------- 99
- Integrated rate equation, Pseudo first order reaction ---------- 100
- Effect of temperature & the reaction rate, effect of catalyst ---------- 100
- Collision theory of chemical reactions ---------- 101

EXAM POINT 101-108

UNIT-10: CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES ---------- 109-125
- Genesis of periodic classification modern periodic law and nomenclature of elements. ---------- 108
- Electronic configuration and types of element. ---------- 109

Search on TG: @apna_pdf

@apna_pdf

■ Periodic trends and properties of the elements. ----110
EXAM POINT **113-125**
UNIT-11: CHEMICAL BONDING AND MOLECULAR STRUCTURE---- 126-154
■ Covalent bond and ionic or electrovalent bond. ----126
■ Bond parameters.----127
■ VSEPR theory ----127
■ Valence bond theory and hybridization. ----128
■ Molecular orbital theory. ----129
■ Hydrogen bonding. ----130
EXAM POINT **133-154**
UNIT-12: REDOX REACTIONS---- 155-163
■ Classical idea of redox reactions.----155
■ Redox Reactions in terms of electron transfer reactions and oxidation number.----155
■ Balancing of redox reactions. ----156
■ Redox reaction and electrode processes. ----156
EXAM POINT **158-163**
UNIT-13: HYDROGEN ---- 164-172
■ Dihydrogen and hydrides ----164
■ Water and heavy water. ----165
■ Hydrogen peroxide (H_2O_2) ----168
EXAM POINT **168-172**
UNIT-14: THE S- BLOCK ELEMENTS ---- 173-188
■ Preparation and properties of alkali metal and their compound. ----173
■ Important compounds of Na and Biological importance of Na and k. ----177
EXAM POINT **178-188**
UNIT-15: P- BLOCK ELEMENTS ---- 189-218
■ Group -13 to group 18 element. ----189
■ Important compound of boron and uses of boron and aluminum and their compound.----193
■ Allotropes of carbon. ----194
■ Some important compound of carbon and silicon. ----194
■ Group-15 (Nitrogen Family). ----195
■ Some Important Compounds of Carbon ans Silicon. ----196
EXAM POINT **199-218**
UNIT-16: D- AND F - BLOCK ELEMENT ---- 219-230
■ Electronic configuration and characteristics of d- block element. ----219
■ Compounds of transition elements. ----220
■ Lanthanoids and actinoids. ----220
■ Some application of d- and f- block element ----221
EXAM POINT **224-230**
UNIT-17: CO - ORDINATION COMPOUNDS ---- 231-240
■ Werner's theory of co- ordination compound.----231
■ Definitions of some important terms related to co-ordination compound. ----231
■ Nomenclature of Co- ordination compound. ----232
■ Isomerism in co-ordination compound bonding in co-ordination compounds and bonding in metal carbonyls.----232
■ Importance and application of co-ordination compound. ----233
EXAM POINT **236-240**
UNIT-18: SURFACE CHEMISTRY---- 241-248
■ Adsorption, catalysis ----241
■ Colloids and their classification emulsion and colloids around us.----243
EXAM POINT **246-248**
UNIT-19: GENERAL PRINCIPLES AND PROCESSES OF ISOLATION OF ELEMENT ---- 249-258
■ Occurrence of metal. ----249
■ Concentration ores. ----250
■ Extraction of crude metal from concentrated ore. ----250
■ Thermodynamics principles of metallurgy.----251
■ Electrochemistry principles of metallurgy and oxidation reduction. ----252
■ Refining and uses of Al, Cu, Zn, Fe.----252
EXAM POINT **253-258**

ORGANIC CHEMISTRY

UNIT-20 SOME BASIC PRINCIPLES AND TECHNIQUES---- 259-269
■ Classification and nomenclature.----259
■ Isomerism.----260
■ Fundamental concepts of organic reaction.----262
■ Methods of purification of organic compounds.----263
■ Qualitative analysis of organic compounds quantitative analysis.----264
EXAM POINT **265-269**

Search on TG: @apna_pdf

UNIT-21: HYDROCARBONS ---------- 270-297
- Alkane----------270
- Alkene----------271
- Alkyne ----------273
- Aromatic Hydrocarbons.----------274

EXAM POINT 278-297

UNIT-22-ENVIRONMENTAL CHEMISTRY ---------- 298-302
- Environmental Pollution ----------298
- Water Pollution----------298
- Green Chemistry ----------299

EXAM POINT 300-302

UNIT-23-HALO ALKANES AND HALOARENES ---------- 303-308
- Classification ----------303
- Nomenclature ----------303
- Methods of preparation ----------303
- Physical properties----------303
- Chemical reactions----------304
- Polyhalogen compounds ----------306

EXAM POINT 306-308

UNIT-24:ALCOHOLS PHENOLS AND ETHERS----------30-317
- Classification ----------309
- Nomenclature ----------309
- Structures of functional groups. ----------309
- Alcohols and phenols----------310
- Some commercially important alcohols----------312
- Ethers----------312

EXAM POINT 312-317

UNIT-25: ALDEHYDES, KETONES AND CARBOXYLIC ACIDS ---------- 318-328
- Nomenclature and structure of carbonyl group. ----------318
- Preparation of aldehydes and ketones.----------318
- Physical properties and chemical properties.----------319
- Nomenclature and structure of carboxyl group. ----------320
- Methods of preparation of carboxylic acids.----------320
- Physical properties and chemical properties.----------321

EXAM POINT 322-328

UNIT-26: AMINES ---------- 329-339
- Structures of amines and classification nomenclature. ----------329
- Preparation of amines ----------329
- Physical properties----------329
- Chemical properties ----------330
- Methods of preparation of diazonium salts. ----------334
- Chemical reaction----------334

EXAM POINT 335-339

UNIT-27: BIOMOLECULES ---------- 340-350
- Carbohydrates ----------340
- Proteins ----------342
- Enzymes and Hormones ----------343
- Vitamins ----------343
- Nucleic acids----------344

EXAM POINT 345-350

UNIT-28: POLYMERS ---------- 351-357
- Classification of polymers----------351
- Types of polymerization reactions ----------351
- Biodegradable polymers ----------352
- Polymers of commercial importance ----------353

EXAM POINT 354-357

UNIT-29: CHEMISTRY IN EVERYDAY LIFE ---------- 358-363
- Drugs and their classification and therapeutic action of different classes of drugs. ----------358
- Chemicals in foods, food preservatives and antioxidants.----------359
- Cleansing agents. ----------360

EXAM POINT 361-363

Unit-30: NUCLEAR CHEMISTRY ----------364

EXAM POINT 364

Unit-31: REACTION MECHANISM---------- 365-384

EXAM POINT 363-384

Search on TG: @apna_pdf

@apna_pdf

1. PHYSICAL CHEMISTRY

Some Basic Concepts of Chemistry

Uncertainty in Measurement

- The number of significant figures in value 5.041 is– **4**
- Express the result of (0.582 + 324.65) to the appropriate number of significant figures– **325.23**
- The number of significant figures in value of π are– **∞**
- The correctly reported answer of the addition of 29.4406, 3.2 and 2.25 will have significant figures-**3**

Law's of Chemical Combinations

- The law of conservation of mass can not holds good for.– **Nuclear reaction**
- Hydrogen and oxygen combine to form H_2O_2 and H_2O containing 5.93% and 11.2% hydrogen respectively, the data illustrates– **Law of multiple proportions**
- 36 g of carbon combines with 32 g of oxygen to form 68 g of CO_2 this best explains-
- Atoms combine in the ratio of small whole numbers to form compounds. This explains-
  Law of multiple proportion
- 12 g of carbon combines with 32 g of oxygen to form 44 g of CO_2 this best explains-
  Law of conservation of mass
- The pairs of compounds $SnCl_2$, $SnCl_4$ illustrates-
  Law of multiple proportions -99

Atomic and Molecular Masses, Mole Concept Molar Masses, Empirical & Molecular Formula

- The molecular mass of glucose ($C_6H_{12}O_6$)–
  180.162 u
- 1 g-atom of nitrogen represents–**11.2 L of N_2 at S.T.P**
- The number of oxygen atoms present in 14.6 g of magnesium bicarbonate is– **0.6 N_A**
- If N_A is Avogadro's number, then the number of oxygen atoms in one g-eqivalent of oxygen is– **$N_A/2$**
- 7.5 grams of a gas occupy 5.8 litres of volume at STP, the gas is– **NO**
- Number of Ca^{+2} and Cl^- ion in 111 g of anhydrous $CaCl_2$ are– **N_A, $2N_A$**
- The maximum volume at N.T.P. is occupied by–
  1 gm-molecule of CO_2
- 23g of sodium will react with ethyl alcohol to give–
  1/2 mole of H_2
- One mole of nitrogen gas has volume equal to–
  22.4 litre of nitrogen at S.T.P.
- An element A (at wt = 75) and another element B (at. wt. = 25) combine to form a compound. The compound contains 75% A by weight. The formula of the compound will be– **AB**
- 60 g of a compound on analysis gave 24 g C, 4g H and 32 g O. The empirical formula of the compound is– **CH_2O**
- An oxide of a metal (M) contains 40% by mass of oxygen. Metal (M) has atomic mass of 24. The empirical formula of the oxide is– **MO**
- The percentage of oxygen in NaOH is– **40**
- A hydrocarbon is composed of 75% carbon. The empirical formula of the compound is– **CH_4**
- An alkaloid contains 17.28% of nitrogen and its molecular mass is 162. The number of nitrogen atoms present in one molecule of alkaloid is– **Two**
- Empirical formula of a compound is CH_2O and its molecular mass is 90. The molecular formula of the compound is– **$C_3H_6O_3$**
- A compound is composed of O and Mn in equal weight ratio. The empirical formula of the compound is.– **Mn_2O_7**
- The empirical formula and molecular mass of a compound are CH_2O and 180 g respectively. The molecular formula of the compound is– **$C_6H_{12}O_6$**
- A metal nitride M_3N_2 contains 28% of nitrogen. The atomic mass of metal M is– **24**
- The empirical formula and molecular mass of a compound are CH_2O and 180 g respectively. The molecular formula of the compound will be–
  $C_6H_{12}O_6$

Stoichiometric Calculations

- The moles of O_2 required for reacting with 6.8 g ammonia. (.... NH_3 + ... O_2 →.... NO + ... H_2O) is–
  0.5
- The molarity of pure water is– **55.6 M**

Search on TG: @apna_pdf

@apna_pdf

- If 1 ml of water contains 20 drops, then the number of molecules in a drop of water is– **1.673×10^{21}**
- The molar ratio of Cr^{2+} to Cr^{3+} in a mixture of $CrSO_4$ and $Cr_2(SO_4)_3$ having equal number of sulphate ions in both sulphates is– **3 : 2**
- In an organic compound of molar mass 108 g mol^{-1} C, H and N atoms are present in 9 : 1 : 3.5 by weight. Molecular formula can be– **$C_6H_8N_2$**
- In the reaction, $2Al(s) + 6HCl(aq) \rightarrow 2Al^{3+}(aq) + 3H_2(g)$,– **11.2 L H_2(g) at STP is produced for every mole HCl(aq)**
- The molarity of a solution, that contains 5.85 g of NaCl (s) per 500 mL– **0.2 mol L^{-1}**
- The molality of the solution containing 18.25 g of HCl gas in 500 g of water is– **1 m**
- The mass percent of carbon in carbon dioxide is – **27.27%**
- If the density of a solution is 3.12 g mL^{-1}, the mass of 1.5 mL solution in significant figures is– **4.7 g**
- One mole of carbon weighs 12g, the number of atoms in it is equal to– **6.022×10^{23}**
- The number of moles of hydrogen molecules required to produce 20 moles of ammonia through Haber's process is– **30**
- Number of significant figures in 6.62×10^{-34}– **Three**
- The number of significant figures in 2.653×10^4 is– **4**
- Chemical fertilizer are– **Urea, Sodium nitrate, Ammonium sulphate**
- Total number of significant figures present in 0.010100×10^3 are – **5**
- Appropriate significant figures as a result of addition of 3.0223 and 5.041– **8.063**
- Total seconds as there in 3 days– **259200 s**

Law of conservation of mass

- Illustrates the law of multiple proportions, the pairs is– **PbO, PbO_2**
- The main drawback of Dalton's atomic theory is– **It could not explain the law of gaseous volumes, It could not explain how and why atoms combine to form molecules**
- The mass of one mole of a substance in grams is called its– **Molar mass**
- The mass percent of oxygen in ethanol is– **34.78%**
- The mode of concentration that does not change with temperature– **Molality**
- A measured temperature on Fahrenheit scale is 200^0F. This reading on Celsius scale will be– **93.3^0C**

EXAM POINT

Uncertainty in measurement

The units of surface tension and viscosity of a liquid respectively are– **N m^{-1}, kg m^{-1} s^{-1}**	**TS-EAMCET-09.08.2021, Shift-I WB-JEE-2015**
The prefix 10^{18} is– **Exa**	**BITSAT 2015, 2006**
For a A + B products the rate of the reaction is given by Rate = K [A] $[B]^2$. The units of rate constant (K) will be– **mol^{-2} L^2S^{-1}**	**AP EAPCET 20.08.2021 Shift-II**
Unit of angular momentum of an electron in an orbital of an atom– **J-s**	**Kerala-CEE-2019**
The SI unit of electrochemical equivalent is– **kg C^{-1}**	**MHT CET-03.05.2019, SHIFT-I**
The absolute zero temperature is 0 Kelvin. In ºC unit the absolute zero temperature is – **–273.15ºC**	**NDA (II)-2018**
The SI unit of density is– **kg m^{-3}**	**MHT CET-2018**
The unit of atomic mass, amu is– **u**	**MHT CET-2018**
The dimension of $[ML^0T^{-2}]$ is- **Surface tension**	**WB-JEE-2017**
Dimension of universal gas constant (R) is– **$[VPT^{-1}n^{-1}]$**	**J & K CET-(2012)**
How is 0.0120 written as a scientific notation– **1.2×10^{-2}**	**UPTU/UPSEE-2011**
The charge on an electron in Coulombs is– **1.602×10^{-19}**	**BCECE-2009**
The value of amu is – **1.66×10^{-27} kg**	**UP CPMT-2003**
The radius of an atomic nucleus is generally expressed in units is – **Fermi**	**AP-EAMCET (Medical), 2001**
The particles size of colloidal system is – **10^{-6} m to 10^{-9} m**	**(NEET-1996)**
The dimensions of pressure are the same as that of– **Energy per unit volume**	**NEET-1995**

Search on TG: @apna_pdf

@apna_pdf

Laws of chemical combination		
The mass of one mole of electron is–	**0.55 mg**	**UP CPMT-2010** **UPTU/UPSEE-2006**
The number of moles of oxygen obtained by the electrolytic decomposition of 108 g water is	**3**	**JIPMER-2008, JCECE-2007**
The number of moles of $KMnO_4$ reduced by one mole of KI in alkaline medium is–	**Two**	**JCECE-2012** **JIPMER-2007**
A gas is found to have a formula $[CO]_x$. Its vapour density is 70, the x is–	**5.0**	**BCECE-2007** **BITSAT-2006**
Number of atoms of He is 100 amu of He (atomic wt. of He is 4) are–	**25**	**BITSAT-2012** **BCECE-2008**
The number of electron present in 2.3g of NO_2 is–	**6.92×10^{23}**	**Assam CEE-2021**
Number of atom in 5.586 g Fe ($M = 55.86\ g\ mol^{-1}$) is–	**Twice of 0.6 g of C**	**Assam CEE-2021**
Number of moles of dichromate needed to oxidizes one mole of Sn^{2+} is–	**1/3**	**TS-EAMCET 09.08.2021, Shift-I**
$KMnO_4$ oxidises oxalic acid in acidic medium. The number of CO_2 molecules produced per mole of $KMnO_4$ is	**5**	**TS EAMCET 05.08.2021, Shift-I**
The moles of electrons weighs in one kg is –	**1.8×10^6**	**TS EAMCET 10.08.2021, Shift-II**
When oxalic acid is oxidised with acidified $KMnO_4$, the number of moles of CO_2 liberated is (consider balancing the reaction)–	**10**	**TS EAMCET 10.08.2021, Shift-I**
The number of sodium ions present in 0.5 mole of sodium ferrocyanide is–	**12×10^{23}**	**TS-EAMCET (Engg.), 05.08.2021 Shift-II**
The volume strength (in L) of 3N H_2O_2 is approximately–	**17**	**AP EAPCET 24.08.2021 Shift-II**
The mole elevation constant is the ratio of Elevation in boiling point to–	**Molality**	**AP EAPCET 19-08-2021 Shift-I**
One mole of oxygen gas at STP is equal to–	**6.022×10^{23} molecules of oxygen**	**AP EAMCET (Engg.) 17.09.2020 Shift-I**
Units is useful in relating concentration of solution with its vapour pressure–	**Mole fraction**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
The gram of sodium (atomic mass 23 u) is required to prepare one mole of ethane from methyl chloride by Wurtz reaction–	**46**	**MHT CET-02.05.2019, Shift-II**
The volume of 1 mole of any pure gas at standard temperature and pressure is always equal to–	**$0.022414\ m^3$**	**MHT CET-02.05.2019, Shift-II**
In the reaction of oxalate with permanganate in acidic medium, the number of electrons involved in producing one molecule of CO_2 is–	**1**	**[JEE Main 2019, 10 Jan Shift-II]**
Total number of atoms in 44 g of CO_2 is–	**1.806×10^{24}**	**J & K CET-(2019)**
The amount of water (g) produced by the combustion of 32 g of methane is–	**72 g**	**Assam CEE-2019**
100 mL brandy contains 40 mL ethanol. The mole fraction of water is–	**0.6**	**CG PET -2018**
Mass % of carbon in ethanol is–	**52**	**Kerala-CEE-2018**
The Avogadro number or a mole represents–	**6.02×10^{23} atoms**	**HP CET-2018**
How many moles of electrons will weigh one kilogram–	$\frac{1}{9.108 \times 6.023} \times 10^8$	**WB-JEE-2018**
The number of molecules of 8 g of oxygen gas at NTP is–	$\frac{1}{4} \times 6.022 \times 10^{23}$	**Assam CEE-2018**
Number of electrons present in 3.6 mg of NH_4^+ are–	**1.20×10^{20}**	**AMU-2017**
The yield of acetanilide in the reaction (100% conversion) of 2 moles of aniline with 1 mole of acetic anhydride is–	**270 g**	**WB-JEE-2017**

Search on TG: @apna_pdf

@apna_pdf

How much CO_2 is produced on heating of 1 kg of carbon– **11/3 kg**	**NDA (II)-2017**
The compound $C_6H_{12}O_4$ contains– **Six times the mass percent of C as compared to the mass percent of H**	**NDA (II)-2017**
The number of moles of H_2O in one litre is– **55.55**	**SRMJEEE – 2015, 2010**
If 27 g of water is formed during complete combustion of pure propene (C_3H_6), the mass of propene burnt is– **21 g**	**Kerala-CEE-2016**
Number of atoms of sulphur in 9.8 grams of H_2SO_4 are– **0.6023×10^{23}**	**BCECE-2016**
For 1 molar solution of NaCl in water at 25^0C and 1-atm pressure show that– **Molarity = normality**	**BCECE-2016**
20 volume of H_2O_2 means– **1 mL of solution liberate 20 mL of O_2 at STP**	**JCECE - 2016**
The number of oxygen atoms in 4.4g of CO_2 is– **1.2×10^{23}**	**Karnataka-CET-2016**
The ions per molecular are produced in the solution, when Mohr salt is dissolved in excess of water– **5**	**Karnataka-CET-2015**
A mixture of gases contains H_2 and O_2 gases in the ratio of 1 : 4 (w/w). The molar ratio of the two gases in the mixture– **4 : 1**	**NEET-2015, cancelled**
The total number of protons in 10g of calcium carbonate is– **3.0115×10^{24}**	**Assam CEE-2014**
The volume strength of 1 molar solution of H_2O_2 is– **11.2**	**JCECE - 2014**
The system that contains the maximum number of atoms is– **2 g of H_2**	**WB-JEE-2014**
The volume occupied by 16 g of oxygen gas at S.T.P. is– **11.2 L**	**AMU-2013**
The mass of 112 cm^3 of NH_3 gas at STP is– **0.085 g**	**Karnataka-CET-2013**
The number of water molecules present in a drop of water weighing 0.018 g is– **6.022×10^{20}**	**Karnataka-CET-2013**
H_2O_2 oxidises MnO_2 is MnO_4^- in basic medium, H_2O and MnO_2 react in the molar ratio of– **3 : 2**	**BCECE-2013**
Number of atoms in 560 cm^3 of oxygen at S.T.P. is– **$\frac{1}{20} \times 6.022 \times 10^{23}$**	**COMEDK-2012**
The vapour density of a mixture containing NO_2 and N_2O_4 is 27.6 Mole fraction of NO_2 in the mixture is– **0.8**	**AIIMS-2012**
Avogadro number (6.023×10^{23}) of carbon atoms are present in– **44 grams of $^{12}CO_2$**	**J & K CET-(2012)**
The total number of electrons present in 18 mL of water (density = 1g mL^{-1}) is– **6.02×10^{24}**	**Karnataka-CET-2012**
The mole fraction of methanol is in 4.5 molal aqueous solution is– **0.05**	**Kerala-CEE-2012**
The number of sodium atoms in 2 moles of sodium ferrocyanide is– **48×10^{23}**	**UPTU/UPSEE-2012**
If one mole of a substance is present in 1kg of solvent then its concentration is called– **Molal conc**	**BCECE-2011**
0.1 mol HCl is equal to– **3.65 g**	**JIPMER-2011**
The number of molecules of CO_2 liberated by the complete combustion of 0.1 g atom of graphite in air is– **6.02×10^{22}**	**AP-EAMCET- (Engg.) - 2010**
The number of water molecules is maximum in– **18 moles of water**	**NEET-2013**
The total number of atoms of all elements present in 1 mole of ammonium dichromate is– **114.437×10^{23}**	**AMU – 2010**
In redox reaction 1 g-eq of reducing agent requires P gm-eq. of oxidizing agent. The value of P is– **1**	**BITSAT 2010**
Molality of a solution is equal to– **$\frac{\text{number of Moles of solute}}{\text{number of kilogram of solvent}}$**	**CG PET- 2010**
The molecules present in 5.6 L of sulphur dioxide at STP is– **1.5×10^{23}**	**J & K CET-(2010)**
The number of atoms in 0.1 mol of triatomic gas is (N_A=6.02×10^{23} mol^{-1}) **1.806×10^{23}**	**NEET-2010**
The moles of helium gas occupy 22.4 L at 0^o C and at 1 atm pressure– **1.0**	**BCECE-2010**
1 mole of CO_2 contains– **6×10^{23} atoms of C**	**BCECE-2009**
If NO_2(N_2O_4) is dissolved in NaOH, we get solution of– **Mixture of $NaNO_2$ and $NaNO_3$**	**CG PET-2009**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

If 'F' is Faraday and 'N' is Avogadro number, then charge of electron can be expressed as– **F/N**	**CG PET -2009**
The number of molecules in 18 mg of water in terms of Avogadro number N is– **10^{-3} N**	**J & K CET-(2009)**
The volume of oxygen at STP in litres is required to burn 4 gm of methane gas completely– **11.2**	**J & K CET-(2009)**
The number of electrons required to reduce 4.5×10^{-5} g of Al is– **3.01×10^{18}**	**MHT CET-2009**
Contains greatest number of oxygen atoms– **1 g of O, 1 g of O_2, 1 g of O_3**	**UPTU/UPSEE-2009**
One mole of magnesium nitride on the reaction with an excess of water gives– **Two moles of NH_3**	**UPTU/UPSEE-2008**
2 N HCI solution will have same molar concentration as a– **4.0 N H_2SO_4**	**WB-JEE-2008**
1 mole of methyl amine on reaction with nitrous acid gives at NTP– **22.4 Litre of nitrogen**	**WB-JEE-2008**
80 g of oxygen contains as many atoms as in– **5 g of hydrogen**	**Karnataka-CET, 2008**
The number of moles of lead nitrate needed to coagulate 2 moles of colloidal $[AgI]I^-$ is– **1**	**Kerala-CEE-2008**
The number of electrons in a mole of hydrogen molecule is– **12.046×10^{23}**	**BITSAT 2008**
Maximum number of molecules of CH_3I that can react with a molecule of CH_3NH_2 are– **3**	**Karnataka-CET-2007**
Molarity of a given orthophosphoric acid solution is 3M. It's normality is– **9N**	**Karnataka-CET-2007**
One mole of oxygen at 273 K and one mole of sulphur dioxide at 546 K are taken in two separate containers, then– **Kinetic energy of O_2 < kinetic energy of SO_2**	**Karnataka-CET-2007**
The amount of bromine will be required to convert 2 g of phenol into 2, 4, 6-tribromo phenol– **10.22 g**	**UPTU/UPSEE-2007**
138 g of ethyl alcohol is mixed with 72 g of water. The ratio of mole fraction of alcohol to water is– **3 : 4**	**AP EAMCET (Engg.) -2007**
CO_2 gas obtained by the combustion of 12 mL butane gas is– **48 mL**	**CG PET -2006**
1.25 g NH_3 contains how many atoms– **1.77×10^{23}**	**JCECE - 2006**
Number of atoms of He in 100 amu of He (atomic wt. of He is 4) are– **25**	**UP CPMT-2006**
One mole of CO_2 contains- **6.02×10^{23} atoms of C**	**UPTU/UPSEE-2006**
In the equation $H_2S + 2HNO_3 \longrightarrow 2H_2O + 2NO_2 + S$. The equivalent weight of hydrogen sulphide is– **17**	**BCECE-2006**
Number of moles of $K_2Cr_2O_7$ reduced by one mole of Sn^{2+}– **1/3**	**UP CPMT-2005**
The moles of $Al_2(SO_4)_3$ would be in 50 g of the substance– **0.140 mol**	**UPTU/UPSEE-2005**
The number of moles of proton which can be easily given by butyne-1 (1mole) is– **1**	**CG PET -2005**
1 moles of crystalline NaCl will have how many unit cells– **1.506×10^{23}**	**CG PET -2005**
In 1 mole of NaCl the protons are– **28 moles**	**CG PET -2005**
The number of sodium atoms in 2 moles of sodium ferrocyanide is– **48×10^{23}**	**BITSAT 2005**
Mole fraction of a solute in benzene is 0.2 then find molality of solute– **3.2**	**BCECE-2004**
Vapour pressure of dilute aqueous solution of glucose is 750 mm of mercury at 373 K. The mole fraction of solute is– **1/76**	**J & K CET-(2004)**
One of the mole of a gas at NTP occupies 22.4 litres. This fact was derived from– **Avogadro's hypothesis**	**J & K CET-(2004)**
Number of atoms of oxygen present in 10.6 g of Na_2CO_3 will be– **1.806×10^{23}**	**J & K CET-(2004)**
The numerical value of $\frac{N}{n}$ (where, N is the number of molecules in a given sample of gas and n is the number of moles of the gas) is– **6.02×10^{23}**	**Kerala-CEE-2004**
The mass of 11.2 L of ammonia gas at STP is– **8.5 g**	**Kerala-CEE-2004**
720 g water contain the number of moles– **40**	**JCECE - 2003**

Search on TG: @apna_pdf

@apna_pdf

The total number of protons in 10g of calcium carbonate is (N_0=6.023×10^{23})– **3.01×10^{24}**	**UP CPMT-2003**
The number of moles of $KMnO_4$ that will be needed to react with one mole of sulphite ion in acidic solution is– **2/5**	**AMU-2002**
The volume strength of 1.5 N H_2O_2 solution is– **8.4**	**AMU-2002**
One mole of SO_2 corresponds to– **6.02×10^{23} molecules of SO_2**	
The number of atoms in 0.004 g of magnesium is close to– **10^{20}**	**AMU-2002**
Number of atoms in 560 g of Fe (atomic mass = 56 g mol^{-1}) is– **Twice that of 70 g N_2, half that of 20 g H**	**[AIEEE 2002]**
Weight of 4 L of N_2 gas as N.T.P. is– **5 g**	**J & K CET-(2002)**
One mole of CH_4 contains– **4 g atoms of hydrogen**	**UP CPMT-2002**
120 g of urea is present in 5 L of solution. The active mass of urea is– **0.4**	**UP CPMT-2001**
7.5 g of a gas occupies 5.6 L of volume at S.T.P. The gas is– **NO**	**AP-EAMCET (Medical), 2001**
Temperature does not affect– **Molality**	**AIIMS-1997-2001**
Number of molecules in one litre of water is close to– **55.5 × 6.023 × 10^{23}**	**J & K CET-(2000)**
The number of moles of hydrogen atoms in 3.2 g of methane is– **0.8**	**J & K CET-(1999)**
The number of atoms in 4.25 g of NH_3 is approximately– **6 × 10^{23}**	**NEET-1999**
The molar concentration of 20g of NaOH present in 5 litre of solution is– **0.1 mols/litre**	**AIIMS-1998**
Volume of a gas at NTP is 1.12×10^{-7} cc. The number of molecule in it is– **3.01 × 10^{12}**	**AIIMS-1998**
Ionic compounds contains greater number of ions– **100 g Na_2O (formula mass 62)**	**J & K CET-(1998)**
At STP, the density of a gas (molecular weight 45) is– **2 g/litres**	**J & K CET-(1997)**
Avogadro's number of oxygen atom weight– **16 g**	**AIIMS-1996**
The number of moles of water present in 180 gm of water is– **10**	**AIIMS-1996**
The mole fraction of solute in 20% aqueous H_2O_2 solution is– **0.1168**	**AP EAMCET- 1992**
The number of oxygen atoms in 4.4 g of CO_2 is– **1.2 × 10^{23}**	**NEET-1989**
At STP the density of CCl_4 vapour of g/L will be nearest to– **6.87**	**NEET-1988**
Components form homogeneous mixture– **Ethyl alcohol + water**	**MHT CET-02.05.2019, SHIFT-III**
Volume of water needed to mix with 10 mL 10N HNO_3 to get 0.1N HNO_3 is **–990mL**	**AIIMS-2017**
The proposition 'equal volumes of different gases contain equal numbers of molecules at the same temperature and pressure' is known as– **Avogadro's hypothesis**	**NDA (II)-2017**
On combustion of x-g of ethanol in bomb calorimeter, y-joules of heat energy is produced. The heat of combustion of ethanol (ΔH_{comb}) is– $\Delta H_{comb} = -\frac{y}{x} \times 44\ Jmol^{-1}$	**BCECE-2017**
Combination of one volume of nitrogen with three volumes of hydrogen produces– **Two volumes of ammonia**	**NDA (II)-2016**
The formation of CO and CO_2 illustrates the law of– **Multiple proportion**	**BITSAT 2014**
If Avogadro number N_A, is changed from 6.022 × 10^{23} mol^{-1} to 6.022 × 10^{20} mol^{-1}, this would change– **The mass of one mole of carbon**	**NEET-2012**
The product of atomic weight and specific heat of any element is a constant, approximately 6.4. This is known as– **Dulong Pettit law**	**BITSAT-2011**
Gram molecular volume of oxygen at STP is– **22400 cm^3**	**Karnataka-CET-2007**
The total number of valence electrons in 4.2 g of N_3^- ion is (N_A is the Avogadro's number)– **1.6 N_A**	**NEET-1994**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

Atomic and molecular masses and mole concept and molar mass, empirical and molecular formula	
The highest number of helium atoms is in- **4 mol of helium**	**NEET-05.05.2024**
In acidic medium, the equivalent weight of $K_2Cr_2O_7$ (Mol. wt. = M) is– **M/6**	**WBJEE-2012 UPTU/UPSEE-2009**
Vapour density of a metal chloride is 83. If equivalent weight of the metal is 6, its atomic weight will be– **24**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
The mass of one atom of ^{12}C is – **1.9923×10^{-23}g**	**WB-JEE-2020**
In a flask, the weight ratio of $CH_4(g)$ and $SO_2(g)$ at 298 K and 1 bar is 1:2. The ratio of the number of molecules of $SO_2(g)$ and $CH_4(g)$ is– **1:2**	**COMEDK-2020**
Equivalent mass of $K_2Cr_2O_7$ in acidic solution is equal to– **Molecular mass/ 6.**	**COMEDK-2019**
Equivalent weight of $KMnO_4$ is equal to– **One-fifth its molecular weight**	**COMEDK-2019**
In acid medium MnO_4^- is reduced to Mn^{2+}, by a reducing agent. Then the equivalent mass of $KMnO_4$ is given by– **M/5** (M = molecular mass)	**Manipal-2019**
The equivalent weight of oxalic acid in $C_2H_2O_4.2H_2O$ is– **63**	**NDA (I)-2019**
In the standardization of $Na_2S_2O_3$ using $K_2Cr_2O_7$ by iodometry, the equivalent weight of $K_2Cr_2O_7$ is– **Molecular weight/6**	**Manipal-2018**
The masses of oxygen combine with a fixed mass of hydrogen to form H_2O and H_2O_2, respectively, bear the simple ratio 1:2– **Law of multiple proportions**	**COMEDK-2018**
The number of times the comparative mass of a neutron is heavier than an electron is– **~1842**	**J & K CET-(2018)**
The compound $Na_2CO_3.xH_2O$ has 50% H_2O by mass. The value of "x" is– **6**	**Kerala-CEE-2017**
A bivalent metal has an equivalent mass of 32. The molecular mass of the metal nitrate is– **188**	**COMEDK-2016**
Sulphur forms the chlorides S_2Cl_2 and SCl_2. The equivalent mass of sulphur in SCl_2 is– **16 g/mol**	**AIIMS-2015**
3.011×10^{22} atoms of an element weighs 1.15 g. The atomic mass of the element is– **23**	**AP-EAMCET (Engg.)-2015**
The equivalent weight of $Na_2S_2O_3$ in the reaction is $2Na_2S_2O_3 + I_2 \rightarrow Na_2S_4O_6 + 2NaI$– **M**	**JCECE - 2014**
The ratio of masses of oxygen and nitrogen in a particular gaseous mixture is 1 : 4 The ratio of number of their molecule is– **7:32**	**[JEE Main-2014]**
The mass of one molecule of yellow phosphorus is (Atomic mass, P = 30)– **1.993×10^{-19} mg**	**MHT CET-2014**
Equivalent weight of $(NH_4)_2Cr_2O_7$ in the change is $(NH_4)_2Cr_2O_7 \rightarrow N_2 + Cr_2O_3 + 4H_2O$ – **Mol. wt./6**	**UP CPMT-2013**
The equivalent mass of a certain bivalent metal is 20. The molecular mass of its anhydrous chloride is– **111**	**Karnataka-CET-2012**
A certain gas takes three times as long to effuse out as helium. Its molecular mass will be– **36 u**	**NEET-2012**
Equivalent and molecular masses are same in– **Mohr's salt**	**COMEDK-2011**
The equivalent weight of $MnSO_4$ is half of its molecular weight when it is converted to– **MnO_2**	**CG PET- 2011**
If the equivalent weight of a trivalent metal is 32.7, the molecular weight of its chloride is– **204.6**	**JCECE - 2011**
2g of metal carbonate is neutralized completely by 100 mL of 0.1 N HCl. The equivalent weight of metal carbonate is– **200**	**WB-JEE-2011**

Search on TG: @apna_pdf

@apna_pdf

In the reaction of sodium thiosulphate with I_2 in aqueous medium the equivalent weight of sodium thiosulphate is equal to– **Molar mass of sodium thiosulphate**	**WB-JEE-2010**
The number of water molecules differing in molecular mass formed by hydrogen isotopes and oxygen isotopes– **6**	**SCRA-2010**
The vapour density of ozone is– **24**	**BITSAT-2010**
The equivalent weight of Potassium permanganate ($KMnO_4$) in neutral medium will be– **$\frac{\text{Atomic weight}}{3}$**	**MPPET- 2009**
The standard for atomic mass is– **$_6C^{12}$**	**BCECE-2009**
The equivalent mass of potassium permanganate in alkaline medium is its– **Molar mass itself**	**J & K CET-(2009)**
The formula mass of Mohr's salt is 392. The iron present in it is oxidised by $KMnO_4$ in acid medium. The equivalent mass of Mohr's salt is– **392**	**JCECE - 2009**
A bivalent metal has an equivalent mass of 32. The molecular mass of the metal nitrate is– **188**	**Karnataka-CET, 2009**
Mass of 0.1 mole of methane is– **1.6 g**	**Karnataka-CET, 2008**
Electron density in the yz plane of $3d_{x^2-y^2}$ orbital is– **Zero**	**J & K CET-(2008)**
The milliequivalent in 60 ml 4M H_2SO_4 is– **480**	**[BITSAT – 2007]**
1.520 g of hydroxide a metal on ignition gave 0.995 g of oxide. The equivalent weight of metal is– **9**	**UP CPMT-2006**
The mass of a photon with wave length 3.6 Å is– **6.135×10^{-29} kg**	**AMU-2005**
The standard adopted for the determination of atomic weight of elements is based on– **C^{12}**	**JCECE - 2005**
The mass of carbon anode consumed (giving only carbon dioxide) in the production of 270 kg of aluminium metal from bauxite by the Hall process is– **90 kg**	**NEET-2005**
The ratio of mass of an electron to the mass of a proton is– **1 : 1837**	**UPTU/UPSEE-2004**
Equivalent weight of an acid– **Depends on the reaction involved**	**UPTU/UPSEE-2004**
The number of gram equivalent of H_2SO_4 in 1000 mL 3M solution is– **6**	**JCECE - 2003**
The equivalent weight of $KMnO_4$ in acidic medium is– **31.6**	**UP CPMT-2002**
The oxygen obtained from 72 kg water is– **64 kg**	**UP CPMT-2002**
The weight of a single atom of oxygen is– **2.656×10^{-23} g**	**AIIMS-1998**
The molecular mass of a volatile substance may be measured by– **Victor Meyer's method**	**AIIMS-1994**
The molecular formulae for phosgene and tear gas are …. and …. respectively– **$COCl_2$ and CCl_3NO_2**	**GUJCET-2015, 2016**
An organic compound contains 60% C; 4.48% H and 35.5% O. Its empirical formula is– **$C_9H_8O_4$**	**TS-EAMCET (Engg.), 05.08.2021 Shift-II**
In each molecule of carbon tetrachloride. the mass percent of carbon and chlorine respectively are _____ and _____.– **7.84 & 92.80**	**AP EAPCET 24.08.2021, Shift-I**
A pure compound contains 2.4g of C, 1.2×10^{23} atoms. Its empirical formula is– **CHO**	**Karnataka-CET-2021**
The mass percentage of nitrogen in histamine is– **37.84**	**[JEE Main 2020, 9 Jan Shift-I]**
The formula of dichlorobis (urea) copper (II) is– **$[CuCl_2\{O=C(NH_2)_2\}_2]$**	**COMEDK-2019**
An organic compound is found to contain C= 54.5% , O=36.4% and H=9.1% by mass. Its empirical formula is– **C_2H_4O**	**COMEDK-2019**
The empirical formula of the compound if M = 68% (atomic mass = 34) and remaining 32% oxygen is– **MO**	**AIIMS 25 May 2019 (Morning)**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

Law of Multiple proportion– **H_2O, H_2O_2**	**J & K CET-(2019)**
The percentage of carbon in urea is– (Atomic mass C = 12, H = 1, N = 14, O = 16) **20%**	**MHT CET-02.05.2019, SHIFT-III**
A compound contains 26% nitrogen and 74% oxygen. Its molecular formula will be– **N_2O_5**	**Tripura JEE-2019**
The formulas of the compounds respectively are Bleaching powder; Quicklime; Plaster of Paris; Slaked lime– **$Ca(OCl)_2$, CaO, $CaSO_4\frac{1}{2}H_2O$, $Ca(OH)_2$**	**Assam CEE-2018**
A metal M (specific heat 0.16) forms a metal chloride with 65% chlorine present in it. The formula of the metal chloride will be– **MCl_2**	**WB-JEE-2018**
Two oxides of an non-metal X contain 50% and 40% of non-metal respectively. If the formula of the first oxide is XO_2, Then the formula of second oxide is– **XO_3**	**AP EAMCET-2017**
An alkane has a C/H ratio (by mass) of 5.1428. Its molecular formula is– **C_6H_{14}**	**COMEDK-2017**
Blister copper contains ____ percentage of copper– **98**	**SRMJEEE-2016**
A compound contain three elements X, Y and Z. The oxidation number. Of X, Y and Z are +3, +5 and –2 respectively. The possible formula of the compound is– **$X_3(YZ_4)_3$**	**BCECE-2016**
The percentage of oxygen in CH_2O is– **53.33%**	**JCECE - 2016**
An organic compound contains C = 40%, H = 13.33% and N = 46.67%. Its empirical formula is– **CH_4N**	**Karnataka-CET-2016**
The empirical formula of a compound is CH_2.One mole of this compound has a mass 42g. Its molecular formula is– **C_3H_6**	**CG PET- 2015**
An organic compound contains 90% carbon and 10% hydrogen by mass. Its empirical formula is– **C_3H_4**	**Kerala-CEE-2015**
The formula for sodium trioxalatoaluminate (III) is– **$Na_3[Al(C_2O_4)_3]$**	**COMEDK-2015**
The molecular formula of Dithionic acid is– **$H_2S_2O_6$**	**SRMJEEE – 2014**
Two oxides of a metal contain 50% and 40% metal (M) respectively. If the formula of first oxide is MO_2, the formula of second oxide will be– **MO_3**	**Assam CEE-2014**
The percentage of water of crystallisation of a sample of blue vitriol is– **36.07%**	**JCECE - 2014**
A compound contains 38.8% C, 16% H, 42.5% N. The formula of compound will be– **CH_3NH_2**	**MPPET-2013**
The arsenic content of an agricultural insecticide was reported as 28% As_2O_5. the percentage of arsenic in this preparation is– **18%**	**AMU-2013**
Analysis shows that a binary compound of X (atomic mass = 10) and Y (atomic mass = 20) contains 50% X. The formula of the compound is– **XY_2**	**AMU-2013**
Empirical formula of a compound is CH_2O and its molecular mass is 90, the molecular formula of the compound is– **$C_3H_6O_3$**	**Karnataka-CET-2013**
An organic compound contains 38.8% carbon, 16% hydrogen & 45.2% nitrogen. Its empirical formula is– **CH_3NH_2**	**MPPET - 2012**
In a hydrocarbon, mass ratio of hydrogen and carbon is 1:3, the empirical formula of hydrocarbon is– **CH_4**	**AIIMS-2012**
The formula of chloral is– **CCl_3CHO**	**JCECE - 2012**
The percentage composition by weight of an aqueous solution of solute (molar mass 150) which boils at 373.26K(k_b=0.52) is– **7**	**CG PET- 2011**
An organic contains 49.3% carbon, 6.84% hydrogen and its vapour density is 73. Molecular formula of the compound is– **$C_6H_{10}O_4$**	**BCECE-2010**
Molecular formula of Glauber's salt is– **$Na_2SO_4 \cdot 10H_2O$**	**JCECE - 2010**
The percentage (by weight) of sodium hydroxide in a 1.25 molal NaOH solution is– **4.76%**	**MHT CET-2009**

Search on TG: @apna_pdf

@apna_pdf

An organic compound made of C,H and N contains 20% nitrogen. Its molecular weight is– **70**	**WB-JEE-2009**
The percentage of an element M is 53 in its oxide of molecular formula M_2O_3. Its atomic mass is about– **27**	**Kerala-CEE-2008**
An organic compound contains carbon, hydrogen and oxygen. Its element analysis gave C, 38.71% and H, 9.67%. The empirical formula of the compound would be– **CH_3O**	**NEET-2008**
Composition of azurite mineral is– **$2CuCO_3{\cdot}Cu(OH)_2$**	**WB-JEE-2008**
An unknown element forms an oxide. The equivalent wt. of the element if the oxygen content is 20% by wt– **32**	**WB-JEE-2008**
A compound has the empirical formula CH_2O. Its vapour density is 30. Its molecular formula is– **$C_2H_4O_2$**	**CG PET -2007**
In a compound C, H and N are present in 9 : 1 : 3.5 by weight. If molecular weight of the compound is 108, then the molecular formula of the compound is– **$C_6H_8N_2$**	**UP CPMT-2006**
A compound contains 54.55% carbon, 9.09% hydrogen, 36.36% oxygen. The empirical formula of this compound is– **C_2H_4O**	**UPTU/UPSEE-2004**
A petroleum fraction having boiling range 70-200°C and containing 6-10 carbon atoms per molecule is called– **Gasoline**	**UPTU/UPSEE-2004**
The molecular formula of borazole is– **$B_3N_3H_6$**	**AP EAMCET- 2001**
The molecular formula of gypsum is – **$CaSO_4.2H_2O$**	**AP EAMCET- 2000**
The molecular formula of white phosphorus is– **P_4**	**AP EAMCET- 2000**
The empirical formula of a compound is CH_2O. Its molecular weight is 180. The molecular formula of compounds is– **$C_6H_{12}O_6$**	**AIIMS-1999**
The percentage of oxygen in NaOH is– **40%**	**AIIMS-1996**
The mole percentage of oxygen in a mixture of 7.0 g of nitrogen and 8.0 g of oxygen is– **50**	**A-P EAMCET-1995**
An organic compound having carbon, hydrogen and sulphur contains 4% of sulphur. The minimum molecular weight of the compound is– **800**	**VITEEE 2015**
Caffeine has a molecular weight of 194 u. If it contains 28.9% by mass of nitrogen, number of atom of nitrogen in one molecule of caffeine is– **4**	**VITEEE 2015**
The elemental analysis of an organic compound gave C: 38.71%, H: 9.67% .The empirical formula of the compound is – **CH_3O**	**Kerala CEE -03.07.2022**
Stoichiometry Calculation	
An organic compound has an empirical formula CH_2O. Its vapour density is 45. The molecular formula of compound is– **$C_3H_6O_3$**	**A.P.EAMCET-1995, 1991**
The fractions of Fe^{2+} and Fe^{3+} in $Fe_{0.93}O$ respectively are – **0.85, 0.15**	**GUJCET-2020**
An organic compound contains 24% carbon, 4% hydrogen and remaining chlorine. Its empirical formula is– **CH_2Cl**	**Kerala-CEE-2020**
Pink colour of non-stoichiometric LiCl is due to– **Electrons in the lattice**	**CG PET -2018**
The mass of oxygen gas which occupies 5.6 litres at STP would be– **Half of the gram atomic mass of oxygen**	**COMEDK-2015**
A metal oxide has the empirical formula, $M_{0.96}O_{1.00}$. What will be the percentage of M^{2+} ions in the crystal– **91.67**	**AMU-2015**
The number of moles of electrons required to deposit 36g of Al from an aqueous solution of $Al(NO_3)_3$ is (At. wt. of Al = 27)– **4**	**AP EAMCET (Engg.) - 2012**
The ratio of moles of hydrogen produced when two moles of aluminium react with excess HCl and NaOH separately is– **1 : 1**	**AP - EAMCET(Medical)- 2009**
Value of x in potash alum, $K_2SO_4.Al_x(SO_4)_3 \cdot 24H_2O$ is– **2**	**UP CPMT-2007**
The number of molecules of CO_2 spresent in 44g of CO_2 is– **6.0×10^{23}**	**BCECE-2005**
The number of molecules present in 3.5 g of CO at 0ºC and 760 mm pressure is– **$0.125 \times 6.02 \times 10^{23}$**	**AP-EAMCET-1992**

NEET SPY

Search on TG: @apna_pdf

@apna_pdf

2. Structure of Atom

Sub-Atomic Particles and Atomic Models

- The charge of an electron was discovered by– **Millikan**
- The element used by Rutherford in his famous scattering experiment was– **Gold**
- Be^{2+} is isoelectronic with ions– **Li**
- ($_{32}Ge^{76}$, $_{34}Se^{76}$) and ($_{14}Si^{30}$, $_{16}S^{32}$) are the examples of– **Isobars and isotones**
- The ratio of charge and mass would be greater for– **Electron**
- The nitride ion in lithium nitride is composed of– **7-protons + 10 electrons**
- The ratio of neutrons in C and Si with respective atomic masses 12 and 28 is– **3 : 7**
- If a species has 16 protons, 18 electrons and 16 neutrons, the species and its charge is– **S^2**
- The compound having number of protons is greater than the number of neutrons but number of protons is less than the number of electrons– **OH**

Developments Leading to The Bohr's Model of Atom

- The scientist that proposed the atomic model based on the quantisation of energy for the first time is– **Neil Bohr**
- The value of Rydberg constant is– **109, 677 cm^{-1}**
- The lowest energy of the spectral line emitted by the hydrogen atom in the Lyman series is– $\frac{3hR_Hc}{4}$
- A metal surface is exposed to solar radiations– **The emitted electrons have energy less than a maximum value of energy depending upon the frequency of the incident radiation.**
- Bohr's model can explain– **Spectrum of any atom or ion containing one electron only**
- The species, Bohr's theory is not applicable to– **He^{2+}**
- The quantum of light energy is called– **Photon**

Hydrogen Atom

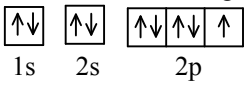
- The velocity of electron present in first Bohr orbit of hydrogen atom– **2.18×10^6 m/s**
- Time taken for an electron to complete one revolution in Bohr orbit of hydrogen atom is– $\frac{4\pi^2mr^2}{nh}$
- The wavelength and name of series respectively for the emission transition for H-atom if it starts from the orbit having radius 1.3225 nm and ends at 211.6 pm would be– **434 nm, Balmer**
- The emission spectrum of hydrogen atom discovered first and the region of the electromagnetic spectrum is belongs, to– **Balmer, Visible**
- The velocity of electron in second shell of hydrogen atom is– **1.094×10^6m/sec**
- If the first ionization energy of H^- atom is 13.6 eV, then the second ionization energy of He^- atom is– **54.4 eV**
- When the electrons of hydrogen atom return to L-shell from shell of higher energy, we get a series of lines in the spectrum. This series is called– **Balmer series**
- The electron of a hydrogen atom jump from n = 4 to n = 1 state, the number of different spectral line emitted are– **6**
- The wave number of the spectral line in the emission spectrum of hydrogen will be equal to 8/9 times the rydberg constant if the electron jumps from– **n = 3 to n = 1**
- The energy ratio of a photon of wavelength 3000Å and 6000Å is– **2:1**
- The first line emission of hydrogen atom spectrum in the Balmer species appears at– **5R/36 cm^{-1}**
- The radius of 2nd Bohr's orbit of hydrogen atom is– **0.2116 nm**
- The maximum energy possessed by an electron is – **At infinite distance from the nucleus**
- The pair where both species have same radius is– **r_2Be^{3+} and r_1H**
- The ratio of ionization energy of H and Be^{+3} is–**1:16**
- The ratio of the energy of the electron in ground state of hydrogen to the electron in 1st excited state of Be^{3+} is– **1 : 4**
- The transition, one quantum of energy is emitted is– **$n_2 = 4 \rightarrow n_1 = 2$, $n_2 = 3 \rightarrow n_1 = 1$, $n_2 = 2 \rightarrow n_1 = 1$**

Search on TG: @apna_pdf

@apna_pdf

- The wavelength of first line of Balmer spectrum of hydrogen will be– **6569 Å**
- If the radius of 2nd Bohr orbit of hyderogen atom is r_2. The radius of third Bohr orbit will be– $\frac{9}{4}r_2$
- The ratio of highest possible wavelength of Lyman series is– **4/3**
- Magnitude of kinetic energy in an orbit is equal to– **Half of the P.E.**
- According to Bohr's theory, the angular momentum of an electron in the 4th orbit is– $\frac{2h}{\pi}$
- If the radius of 1st Bohr orbit be a_0, then radius of 3rd Bohr orbit would be– $9a_0$

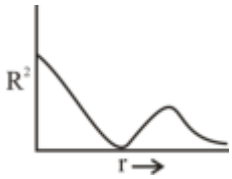
Towards Quantium Mechanical Model of The Atom

- If E_e, E_α and E_p represents the kinetic energy of an electron, α-particle and proton respectively and each moving with same de-broglie wavelength then– $E_e > E_p > E_\alpha$
- Uncertainty principle was given by– **Heisenberg**
- If uncertainty in position and velocity are equal, then uncertainty in momentum will be– $\frac{1}{2}\sqrt{\frac{mh}{\pi}}$
- If de-broglie wavelength of mass 'm' is 100 times of its velocity then its value in term of its mass 'm' and planck's constant "h" is– $10\sqrt{\frac{h}{m}}$
- The wavelength of electron waves in two orbit is in ratio 3:5. The ratio of K.E. of electrons will be–**25:9**
- If uncertainty in position and momentum are equal, then uncertainly in velocity is– $\frac{1}{2m}\sqrt{\frac{h}{\pi}}$
- The de-broglie wavelength associated with a mass of 1kg having K.E. 0.5J is– 6.626×10^{-34} **m**
- For an electron, if the uncertainty in velocity is Δv, the uncertainty in position Δx is given by– $\frac{h}{4\pi\Delta v}$
- If uncertainty in the position of an electron is zero, the uncertainty in its momentum will be– **infinite**
- de-Broglie wavelength associated with a material particle is– **Inversely proportional to momentum**
- The uncertainty in the position of an electron and proton is equal, the ratio of the uncertainties in the velocity of an electron and proton is– **1836:1**
- The species have the same number of electron in its outermost as well as penultimate shell is– Ca^{2+}
- The number of waves made by an electron moving in an orbit having maximum magnetic quantum number +3 is– **4**
- The set of quantum no. not applicable for an electron– **3, 1, –2,** $+\frac{1}{2}$
- The orbital angular momentum of an electron in f-orbital– $\frac{\sqrt{3h}}{\pi}$
- Given K L M N The number of electrons present in $l = 2$ is– 2 8 11 2 **3**
- The maximum number of electrons that can be held by subshell with azimuthal quantum number "ℓ" in an atom is given by– $2(2\ell + 1)$
- The maximum number of electrons that can be associated with a quantum number n = 3, $l = 1$ and m = –1 is– **2**
- The quantum number "m" of a free gaseous atom is associated with– **Spatial orientation of orbital**
- The element is represented by electronic configuration $1s^2 2s^2 2p_x^1 2p_y^1 2p_z^1$ – **N**
- The atomic number of element is 17. The number of orbital containing electron pair in its valence shell is– **3**
- The total number of electrons present in all the p-orbital of bromine are (Given : Atomic no. of Br = 35)– **17**
- The number of unpaired electron in Fe^{3+}(Z = 26) are– **5**
- The orbital angular momentum of p-electron is given as– $\frac{h}{\sqrt{2\pi}}$
- The total number of orbitals in a shell with principle quantum number n is– n^2
- The represents set of quantum numbers of a 4d electron is – **4, 2, 1, –1/2**
- Any f-orbital can accommodate upto– **2 electrons with opposite spin**
- The atomic numbers of elements X, Y and Z are 19, 21 and 25 respectively. The number of electrons present in the M shells of these elements follow the order– **Z > Y > X**
- This electronic configuration shows element of–  1s 2s 2p **Fluorine**
- The de-broglie wavelength of an electron moving in a circular orbit is λ. The minimum radius of the orbit is given by– $\frac{\lambda}{2\pi}$
- Last line of Lyman series for H–atom has wavelength λ_1 Å. The 2nd line of Balmer series has wavelength λ_2 Å, then– $\frac{16}{\lambda_2} = \frac{3}{\lambda_1}$

TEAM SPY

Search on TG: @apna_pdf
@apna_pdf

- The electron having quantum numbers n = 4 & m = 2 is– **the value of ℓ may be 2, The value fo ℓ may be 3, The value of s may be +1/2**
- Change in orbit angular momentum when an electron makes a transition corresponding to 3rd line of Balmer series in Li^{2+} ion is– $\frac{3h}{2\pi}$
- The ionisation energy of H atom is x J/atom. The wavelength of first Balmer line for He^+ ion is– $\frac{9he}{5x}$
- The total number of orbitals in the principal shell of He^+ that has energy equal to $\frac{-Rhc}{4}$ (where R is Rydberg's constant) is– **4**
- If ΔE is the energy emitted in eV when an electronic transition occurs from higher energy level to lower energy level in H–atom, the λ of the line produced is approximately equal to– $\frac{12375}{\Delta E}\,\text{Å}$
- The energy of a possible excited state of hydrogen is– **–3.4 eV**
- The ratio of area covered in 2nd orbit to first orbit is– **16 : 1**
- An electron in an atom undergoes transition in such a way potential energy will be– $+\frac{3}{2}x$
- The transition in He^+ ion shall have the same wave number as the first line in Balmer series of hydrogen atom is– **$6 \rightarrow 4$**
- The maximum number of electrons that can be accomodated in principal number 4 – **32**
- The number of elements would be in the 11nd period of the Periodic Table if the spin quantum numbers could have the value $+\frac{1}{2}, 0, -\frac{1}{2}$ – **12**
- In an atom, having 2K, 8L, 18M and 2N electrons in the ground state. The total number of electrons having magnetic quantum number, m = 0 is– **14**
- The probability density curve for 2s electron appears like as–



- If an electron in H atom has an energy of –78.4 kcal/mol. The orbit in the electron is present is– **2nd**
- Difference between n^{th} and $(n+1)^{th}$ Bohr's radius of H– atom is equal to its $(n-1)^{th}$ Bohr's radius. The value of n is– **4**
- Light of wavelength λ shines on a metal surface with intensity x and the metal emits Y electrons per second of average energy, Z. The happen to Y and Z if x is doubled– **Y will be doubled but Z will remain same**
- Splitting of spectral lines under the influence of electric field is called– **Stark effect**
- The conclusions could not be derived from Rutherford's α-particle scattering experiment is– **Electrons move in a circular path of fixed energy called orbits.**
- The properties of atom could be explained correctly by Thomson model of atom is–**Overall neutrality of atom**
- Two atoms are said to be isobars if– **Sum of the number of protons and neutrons is same but the number of protons is different**
- The number of radial nodes for 3p orbital is– **1**
- Number of angular nodes for 4d orbital– **2**
- The responsible to rule out the existence of definite paths or trajectories of electrons is– **Heisenberg's uncertainty principle**
- Total number of orbitals associated with third shell will be– **9**
- Orbital angular momentum depends on– ***l***
- Chlorine exists in two isotopic forms. C*l*-37 and C*l*-35 but its atomic mass is 35.5. This indicates the ratio of C*l*-37 and C*l*-35 is approximately– **1 : 3**
- The pair of ions having same electronic configuration is– **Fe^{3+}, Mn^{2+}**
- For the electrons of oxygen atom, is– **The two electrons present in the 2s orbital have spin quantum numbers, m_s but of opposite sign**
- If waves travelling at same speeds, matter waves have the shortest wavelength– **Alpha particle (He^{2+})**
- The number of angular nodes and radial nodes in 3s orbital are– **0 and 2, respectively**
- 4d, 5p, 5f and 6p orbitals are arranged in the order of decreasing energy– **5f > 6p > 5p > 4d**
- The series of transitions in the spectrum of hydrogen atom fall in visible region is– **Balmer series**
- Be^{2+} is isoelectronic with the ions– **Li^+**
- The ion that is isoelectronic with CO is– **CN^-**
- An isotone of $^{76}_{32}Ge$ is– **$^{77}_{33}As$**
- Isoelectronic species are– **CO, CN^-, NO^+, C_2^{2-}**
- ..... ions has electronic configuration $[Ar]3d^6$– **Co^{3+}**
- Atomic number and mass number of an element M are 25 and 52 respectively. The number of electrons, protons and neutrons in M^{2+} ion are respectively– **23, 25 and 27**
- The time taken by the electron in one complete revolution in the n^{th} Bohr's orbit of the hydrogen atom is– **Directly proportional to n^3**

Search on TG: @apna_pdf

@apna_pdf

- According to the Bohr theory, the transition in the hydrogen atom will give rise to the least energetic photon– **n = 6 to n = 5**
- ..... modified Bohr's theory by introducing elliptical orbits for electron path– **Sommerfield**
- The ratio of the energy required to remove an electron from the first three Bohr's orbits of hydrogen is– **36 : 9 : 4**
- The longest wavelength line in Balmer series of spectrum of H-atom– **656 nm**
- Total number of spectral lines in UV regions, during transition from 5^{th} excited state to 1^{st} excited state– **Zero**
- An electron jumps lower orbit to higher orbit, when– **Energy is absorbed**
- Electronic energy is negative because– **Energy is zero at infinite distance from the nucleus and decreases as the electron comes towards nucleus**
- Zeeman effect refers to the– **Splitting of the spectral lines in a magnetic field**
- The principal and azimuthal quantum number of electron in 4f orbitals are– **4, 3**
- In any sub-shell, the maximum number of electrons having same value of spin quantum number is– **$2l + 1$**
- Two electrons occupying the same orbital are distinguished by– **Spin quantum number**
- The orientation of an atomic orbital is governed by– **Magnetic quantum number**
- Maximum number of electrons in a subshell of an atom is determined by– **$4l + 2$**
- The subshell can accommodate as many as 10 electrons is– **d**
- A p-orbital can accommodate upto– **Two electrons**
- The orbital is with the four lobes present on the axis is– **$d_{x^2-y^2}$**
- Any f-orbital can accommodate upto– **2 electrons with opposite spin**
- The angular momentum of a p-electron is given as– **$\frac{h}{\sqrt{2\pi}}$**
- The pairs of d-orbitals will have electron density along the axes– **d_{z^2}, $d_{x^2-y^2}$**
- The total number of atomic orbitals in fourth energy level of an atom is– **16**
- The number of radial nodes in 4s and 3p orbitals are respectively– **3, 1**
- Radial nodes in 3s and 3p-orbitals are respectively– **2, 1**
- The number of lobes in most of the d-orbitals are– **4**
- The total number of subshells in fourth energy level of an atom is– **4**
- A transition element X has a configuration $(Ar)3d^4$ in its +3 oxidation state. Its atomic number is– **25**
- The ratio of charge to mass of an electron in coulombs per gram was determined by J.J. Thomson. He determined this ratio by measuring the deflection of cathode rays in electric and magnetic fields. The value he found for this ratio is– **-1.76×10^8 coulombs/g**
- The experiment that is responsible for finding out the charge on an electron– **Millikan's oil drop experiment**
- An element with mass number 81 contains 31.7% more neutrons as compared to protons. The symbol of the atom– **$^{81}_{35}Br$ –**
- The wavelength of visible light is– **380 nm – 760 nm**
- The spectrum of white light ranging from red to violet is called a continuous spectrum because– **The violet colour merges into blue, blue into green, green into yellow and so on**
- The electron in Bohr's model of hydrogen atom is pictured as revolving around the nucleus in order for it to– **Possess energy**
- The color corresponding to the wavelength of light emitted the electron in a hydrogen atom undergoes transition from n = 4 to n = 2 is– **Blue**
- The series of lines are the only lines in hydrogen spectrum that appear in the visible region– **Balmer**
- The third line of the Balmer series in the emission spectrum of the hydrogen atom is due to the transition from the– **Fifth Bohr orbit to the second Bohr orbit**
- The frequency of radiation absorbed or emitted the transition occurs between two stationary states with energies E_1 (lower) and E_2 (higher) is given by– $\nu = \frac{E_2 - E_1}{h}$
- The angular momentum of an electron in a given stationary state can be expressed as $m_e vr = n\frac{h}{2\pi}$. Based on this expression an electron can move only in those orbits for which its angular momentum is– **Integral multiple of $\frac{h}{2\pi}$**
- According to Bohr's theory, the angular momentum of an electron in 5^{th} orbit is– **$\frac{2.5h}{\pi}$**
- The radius of the stationary state that is also called Bohr radius is given by the expression $\gamma_n = n^2 a_0$ where the value of a_0 is– **52.9 pm**
- If the radius of first Bohr orbit is x pm, then the radius of the third orbit would be– **(9 × x) pm**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

- The longest wavelength doublet absorption transition is observed at 589 and 589.6 nm. Energy difference between two excited states is– **3.31×10^{-22} J**
- Bohr's theory can also be applied to the ions like– **He^+, Li^{2+}, Be^{3+}**
- According to Bohr's theory, the electronic energy of H-atom in Bohr's orbit is given by– $$E_n = \frac{2.179 \times 10^{-18} \times Z^2}{\pi^2} \text{ J}$$
- The trend of energy of Bohr's orbits is– **Energy of the orbit increases as we move away from the nucleus**
- The negative electronic energy (negative sign for all values of energy) for hydrogen atom means is– **The energy of an electron in the atom is lower than the energy of a free electron at rest that is taken as zero**
- The energy of the electron in a hydrogen atom has a negative sign for all possible orbits because– **the electron is attracted by the nucleus and is present in orbit n, the energy is emitted and its energy is lowered**
- The probability of finding out an electron at a point within an atom is proportional to the– **Square of the orbital wave function i.e., Ψ^2**
- Two electron present in M shell will differ in– **Spin quantum number**
- The lowest value of n that allows orbital to exist is– **5**
- Total orbitals and electrons are associated with n = 4 are – **16, 32**
- An electron is in of the 3d-orbitals. The possible values of n, *l* and m_l for this electron is– **$n = 3, l = 2, m_l = -2, -1, 0, +1, +2$**
- The possible values of n, *l* and m_l for an atomic orbital 4*f* are– **$n = 4, l = 3, m_l = -3, -2, -1, 0, +1, +2, +3$**
- Total electrons in an atom having the quantum numbers n= 4 and spin value= –1/2 is– **16**
- Total electrons are associated with the given set of quantum numbers n = 3 and *l* = 1 and m = –1are – **2**
- The orbital angular momentum of an electron in 2s-orbital is– **Zero**
- Two values of spin quantum numbers i.e., +1/2 and –1/2 represent – **Two quantum mechanical spin states which refer to the orientation of spin of the electron**
- The region where probability density function reduces to zero is called– **Nodal surfaces**
- The 3d-orbitals having electron density in all the three axis is– **$3d_{z^2}$**
- The number of radial nodes and angular nodes for d-orbital can be represented as– **(n–3) radial nodes + 2 angular nodes = (n – 1) total nodes**
- An electron can enter into the orbital when– **Value of (n + *l*) is minimum**
- Total number of orbitals in total are associated with n^{th} energy level is– **n^2**
- Effective nuclear charge (Z_{eff}) for a nucleus of an atom is defined as– **The net positive charge experienced by electron from the nucleus**
- The electronic configuration of O^{2-} ion is– **$1s^2\ 2s^2\ 2p^6$**
- The configuration of the valence orbital of an element with atomic number 22 is– **$4s^2\ 3d^2$**
- Three elements 'X', 'Y' and 'Z' have atomic numbers 18, 19 and 20 respectively. Total electrons present in the M shells of these elements are – **8, 8, 8**
- The electronic transition from n = 2 to n = 1 will produce shortest wavelength in– **Li^{2+} ion**
- The number of neutrons and electrons, respectively, present in the radioactive isotope of hydrogen is– **2 and 1**
- A certain orbital has no angular nodes and two radial nodes. The orbital is– **3s**
- The maximum number of electrons in a subshell is given by the expression– **$4l + 2$**

EXAM POINT

Sub–atomic particles and atomic models

The pair, of ions in isoelectronic with Al^{3+} is– **O^{2-} and Mg^{2+}**	**JEE Main-25.06.2022, Shift-I**
Molecules contains an incomplete octet of the central atom– **$AlCl_3$**	**Kerala CEE -03.07.2022**
The oxide contains an odd electron at the nitrogen atom is– **NO_2**	**JEE Main-26.06.2022, Shift-II**
The difference between number of Neutrons and Protons is positive for– **Tritium atom**	**MPPET-2013**
One atom of $^{39}_{19}K$ contains– **19p; 20n and 19e$^-$**	**AP-EAMCET/1991**

Search on TG: @apna_pdf

@apna_pdf

There are six electrons, six protons and six neutrons in an atom of an element. The atomic number of the element is– **6**	**NDA (II)-2016**
The atomic number of the element with symbol Uus is– **117**	**TS-EAMCET-2016**
The sum of the total number of neutrons present in protium, deuterium and tritium is– **3**	**TS-EAMCET (Engg.), 05.08.2021 Shift-II**
$_{20}Ca^{40}$ has magic number of – **Protons and Neutrons**	**AP EAMCET (Medical) - 1998**
The species that has the same number of electrons as $^{35}_{17}Cl$ is– $^{40}_{18}Ar^{+}$	**NDA (II)-2017**
The characteristics of elements X, Y and Z with atomic numbers, respectively, 33, 53 and 83 are– **X is a metalloid, Y is a non-metal and Z is a metal**	**JEE Main 16.03.2021, Shift-II**
The masses of an electron, a proton and a neutron respectively will be in the ratio– **1836.15 : 1838.68**	**AP EAPCET 20.08.2021 Shift-I**
Elements X and Y belong to the same group. 19, 55 Set of atomic numbers represent– **X and Y**	
The number of protons in a negatively charged atom (anion) is– **Less than the number of electrons in the atom**	**NDA (II)-2011**
Number of protons atomic number of – Element	**NDA (II)-2011**
Isotope used in brain scan is– $_6C^{11}$	**SRMJEEE-2010**
The number of electrons and neutrons of an element is 18 and 20 respectively. Its mass number is– **38**	**AIIMS-1994**
The number of electrons in $[_{19}K^{40}]^{-1}$ is– **20**	**AIIMS-1994**
Positron is– **Electron with positive charge**	**AIIMS-1998**
The nitride ion in lithium nitride is composed of– **7 protons + 10 electrons**	**CG PET -2018**
Isoelectronic pair– CN^-, O_3	**JCECE - 2013**
N_2 and CO are– **Isoelectronic**	**J & K CET-(2002)**
The symbol of the species with number of electrons, protons and neutrons as 18, 16 and 16 respectively is– $^{32}_{16}S^{2-}$	**AMU-2014**
Atomic number equal to the– **Number of the protons in the nucleus**	**AMU–2001**
The ratio of electron, proton and neutron in tritium is– **1 : 1 : 2**	**Assam CEE-2014**
The number of electrons, protons and neutrons in phosphide ion (P^{3-}) is– **18, 15, 16**	**Assam CEE-2021**
The energy released in an atom bomb explosion is mainly due to– **Lesser mass of products than initial material**	**BCECE-2006**
n/p ratio during positron decay– **Increases**	**CG PET- 2015**
If the de-Broglie wavelength of the electron in n^{th} Bohr orbit in a hydrogenic atom is equal to $1.5\pi a_0$ (a_0 is Bohr radius), then the value of n/Z is– **0.75**	**[JEE Main 2019, 12 Jan Shift-II]**
The introduction of a neutron into the nucleus of an atom would lead to a change in– **Atomic mass**	**CG PET -2019**
The element with atomic number 55 belongs to block of the periodic table is– ***s*-block**	**CG PET -2004**
Neutrons are found in atoms of all elements except in– **Hydrogen**	**CG PET -2004**
The triad of the nuclei that is isotonic– $_6C^{14}$, $_7N^{15}$, $_9F^{17}$	**HP CET-2018**
Three elements X, Y and Z are in the 3rd period of the periodic table. The oxides of X, Y and Z, respectively, are basic, amphoteric and acidic. The order of the atomic number of X, Y and Z is– **X < Y < Z**	**(JEE Main 2020, 2 Sep Shift-II)**
The group having isoelectronic species is– O^{2-}, F^-, Na^+, Mg^{2+}	**(JEE Main-2017)**
Sets of ions represents a collection of isoelectronic species– K^+, Cl^-, Ca^{2+}, Sc^{3+}	**Assam CEE-2020 (AIEEE 2006)**
According to the periodic law of elements, the variation in properties of elements is related to their– **Atomic numbers**	**(AIEEE 2003)**
The group number, number of valence electrons and valency of an element with atomic number 15, respectively, are– **15, 5 and 3**	**(JEE Main 2019, 12 April Shift-I)**
The isoelectronic set of ions is– N^{3-}, O^{2-}, F^- and Na^+	**(JEE Main 2019, 10 April Shift-I)**

TEAM SIV

Search on TG: @apna_pdf

@apna_pdf

The size of the iso-electronic species Cl^-, Ar and Ca^{2+} is affected by– **nuclear charge**	**(JEE Main 2019, 8 April Shift-I)**
The atomic number of unnilunium is– **101**	**(JEE Main 2020, 6 Sep Shift-II)**
Constitutes a group of the isoelectronic species are– NO^+, C_2^{2-}, CN^-, N_2	**JEE Main-09.10.2018**
Atoms with identical atomic number but different atomic mass number are known as– **Isotopes**	**J & K CET-(2014)**
Negatively charged particles are called– **Electrons**	**J & K CET-(2014)**
Mass number of an atom is the sum of– **Number of protons + number of neutrons**	**J & K CET-(2014)**
Mass of a proton is– **1.00727 amu.**	**J & K CET-(2014)**
$^{39}_{19}K$ and $^{40}_{20}C$ are– **Isotones**	**J & K CET-(2001)**
The specific heat of a metal is 0.11 and its equivalent weight is 18.61. Its exact atomic weight is– **55.83**	**J & K CET-(1998)**
Species is isotonic with $_{37}Rb^{86-}$ $_{38}Sr^{87}$	**J & K CET-(1997)**
Atoms with same atomic number and different mass numbers are called– **Isotopes**	**JCECE - 2009**
The number of electrons, neutrons and protons in a species are equal to 10,8 and 8 respectively. The proper symbol of the species is– $^{16}_{8}O^{2-}$	**JIPMER-2011**
In long form of periodic table the properties of the elements are a periodic function of their– **Atomic number**	**JIPMER-2010**
If two atoms have equal number of electron it is called– **Isoelectronic**	**JIPMER-2019**
The number of electrons, protons and neutrons in a species are equal to 10, 11 and 12 respectively. The proper symbol of the species is– $^{23}_{11}Na^+$	**Kerala-CEE-2020**
1 u (amu) is equal to– **1.492×10^{-10} J**	**MHT CET-2010**
The number of protons, neutrons and electrons in $^{175}_{71}Lu$, respectively, are– **71, 104and 71**	**NEET-2020**
Isoelectronic speicies are– **CO, CN^-, NO^+, C_2^{2-}**	**AMU-2011 NEET-2000**
Atomic number of an element is equal to the number of– **Protons**	**UP CPMT-2005**
Unit positive charge and 1 amu mass is– **Proton**	**UP CPMT-2003**
The atomic number of an element is 17. The number of orbitals containing electron pairs in its valence shell is– **3**	**UP CPMT-2001**
The binding energy of an atom is 128 MeV. The binding energy per nucleon is 8, the number of nucleon is– **16**	**UP CPMT-2001**
Rutherford's alpha-particle scattering experiment was responsible for the discovery of– **Nucleus**	**NDA (I)-2017**
The number of periods present in the long form of the periodic table is– **7**	**AP-EAMCET (Med.)-1999**
The discovery of cathode rays are made up of electrons– **J. J. Thomson**	**MPPET- 2009**
When 4p orbital in any atom is filled completely, the next electron goes in– **5s**	**AP-EAMCET-1991**
According to Aufbau principle, the sub-shell is occupied by the electron, first has– **Lower energy**	**AP-EAMCET-1993**
Rutherford's experiment on scattering of α-particles showed for the first time that the atom has– **Nucleus**	**AP-EAMCET-1995**
In Rutherford's α-ray scattering experiment, the alpha particles are detected using a screen coated with– **Zinc sulphide**	**AP-EAMCET-1999**
The nucleus of an atom contains– **Proton and neutron**	**MPPET-2008**
"The properties of elements are periodic functions of their atomic weights." This periodic law was given by– **Mendeleev**	**AP EAMCET (Engg.) 17.09.2020 Shift-I**

JEE-ADVANCED

Search on TG: @apna_pdf

@apna_pdf

The number of protons , neutrons and electrons in $^{13}_{6}C$ respectively are– **6, 7, 6**	**AP EAPCET 20.08.2021 Shift-I**
The wavelength of a spectral line emitted by hydrogen atom in the Lyman series is $\frac{16}{15R}$ cm. the value of n_2 (R = Rydberg constant)– **4**	**AIIMS-2011**
According to Moseley, a straight line group is obtained on plotting– **The square root of the frequencies of characteristics X-rays of elements against the atomic numbers**	**SRMJEEE – 2008**
Television picture tube is basically– **Cathode ray tube**	**AMU-2014**
The charge on an electron was discovered by– **Neil Bohr**	**BCECE-2004**
Rutherford's famous experiment with α- particles used this metal– **Au**	**BCECE-2009**
Transition of an electron in H-atom will emit maximum energy– $n_3 \longrightarrow n_2$	**BCECE-2017**
The energy of an electron in n^{th} orbit of hydrogen atom is– $-\frac{13.6}{n^2}$ eV	**CG PET -2007**
For d-electron, the orbital angular momentum is– $\frac{\sqrt{6}\,h}{2\pi}$	**J & K CET-(2004)**
Rutherford's experiment on the scattering of α-particles showed for the first time that the atom has– **Nucleus**	**UPTU/UPSEE-2005**

Development leading to the Bohr's model of atom

The longest wavelength present in Balmer series lines is [Given Rydberg constant = 1.097 x 10^7 m^{-1}]– **656 nm**	
The energy of an electromagnetic radiation is 19.875×10^{-13} erg. its wave number in cm^{-1} is – **10000** ($h=6.625\times10^{-27}$ erg-s; $c=3\times10^{10}$ cm s^{-1})	**AP-EAMCET-2002**
The energy of a photon is 3×10^{-12} erg. its wavelength in nm is – **662** ($h = 6.62 \times 10^{-27}$ erg-s, $c = 3 \times 10^{10}$ cm s^{-1})	**AP-EAMCET-2006**
The velocities of two particles A and B are 0.05 and 0.02 ms^{-1} respectively. The mass of B is five times the mass of A. The ratio of their de-Broglie's wavelength is– **2:1**	**AP-EAMCET-2008**
Two particles of masses m & 2m have equal kinetic energies. The de-Broglie wavelength are in the ratio of– $\sqrt{2}:1$	**AP EAPCET 23-08-2021 Shift-I**
With velocity must an electron travel so that its momentum is equal to that of a photon of wavelength 663 nm– **1098 m/s**	**AP EAPCET 23-08-2021 Shift-I**
The relation between the stopping potential (V_0) and frequency (ν) is correctly represented in [ϕ = Work function]– $V_0 = \frac{h\nu}{e} - \frac{\varphi}{e}$	**TS-EAMCET (Engg.), 05.08.2021 Shift-II**
de Broglie was awarded the Nobel Prize in the year– **1929**	**TS EAMCET 10.08.2021, Shift-I**
One mole of alkene X on ozonolysis gave one mole of acetaldehyde and one mole of acetone. The IUPAC name of X is– **2-methyl-2butene**	**AP EAMCET (Engg.)-2009**
If the wavelength (λ) is equal to the distance travelled by the electron in one second h is the Planck's constant and m is the mass of electron $\lambda = \sqrt{h/m}$	**TS EAMCET 04.08.2021, Shift-I**
If the energies of two light radiations E_1 and E_2 are 25 eV and 100 eV respectively, then their respective wavelength λ_1 and λ_2 would be in the ratio $\lambda_1 : \lambda_2$ = **4 : 1**	**AP EAPCET 19-08-2021, Shift-II**
De Broglie relationship has no significance for– **An iron ball.**	**SRMJEEE – 2009**
The wavelength associated with a particle of mass 3.313×10^{-31} kg moving with velocity 10^3 m/s is– **2×10^{-6} m**	**SRMJEEE – 2010**

Search on TG: @apna_pdf

@apna_pdf

Frequencies of radiation (in Hz) has a wavelength of 600 nm– **5.0×10^{14}**	**AP-EAMCET- (Engg.)-2011**
If the kinetic energy of a particle is reduced to half, de-Broglie wavelength becomes– **$\sqrt{2}$ times**	**AP-EAMCET (Engg.) 2015**
The frequency of radiation emitted, when an electron falls from n = 3 to n = 1. in a hydrogen atom would be– **$2.92\times10^{15}s^{-1}$**	**AP- EAPCET- 07-09-2021, Shift-I**
Transitions of an electron in hydrogen atom emits radiation of the lowest wavelength **$n_2 = 2$ to $n_1 = 1$**	**AP-EAMCET- (Engg.) - 2010**
The basis of quantum mechanical model of an atom is– **Dual nature of electron**	**AP-EAMCET (Engg.) 2013**
The wave number of 4th line in Balmer series of hydrogen spectrum is– (R = 1,09,677 cm^{-1}) **24,372 cm^{-1}**	**AP - EAMCET (Medical) - 2007**
The wavelengths of two photons are 2000Å and 4000Å respectively. The ratio of their energies– **2**	**VITEEE 2019**
The wavelengths of electron waves in two orbits is 3 : 5. The ratio of kinetic energy of electrons will be– **25 :9**	**VITEEE- 2009**
Ratio of energy of photon of wavelength 3000Å and 6000Å is– **2 : 1**	**AIIMS-2012**
The de Broglie wavelength associated with a ball of mass 1 kg having kinetic energy 0.5 J is– **6.626×10^{-34} m**	**AIIMS-2006**
The de- Broglie wavelength of an electron in the ground state of hydrogen atoms is– **0.3328nm** (K.E.= 13.6eV; 1ev=1.602×10^{-19} J)	**AIIMS-2000**
The wavelength of visible light is– **3800Å–7600Å**	**AIIMS-1998**
The de-Broglie wavelength of a particle with mass 1 g and velocity 100 m/s is– **6.63×10^{-33} m**	**NEET-1999**
If the Planck's constant h = 6.6×10^{-34} Js, the de Broglie wavelength of a particle having momentum of 3.3×10^{-24} kg ms^{-1} will be– **2Å**	**BITSAT 2018**
The energy of one mole of photons of radiation whose frequency is 5×10^{14} Hz will be– **199.51 KJ mol^{-1}**	**AMU-2015, 2007**
In hydrogen atom, the de Broglie wavelength of an electron in the second Bohr orbit is [Given that Bohr radius, a_0 =52.9 pm]– **211.6 π pm**	**NEET-Odisha 2019**
The mass of a photon with wavelength 3.6Å shall be– **61.35×10^{-34} kg**	**AMU-2006**
The de-Broglie wavelength (λ) associated with a photoelectron varies with the frequency (ν) of the incident radiation as, [ν_0 is threshold frequency]– $\lambda \mu \frac{1}{(\nu-\nu_0)^{\frac{1}{2}}}$	**[JEE Main 2019, 11 Jan Shift-II]**
The wavelength of a ball of mass 100 g moving with a velocity of 100 ms^{-1} be– **6.626×10^{-35} m**	**Assam CEE-2020**
The energy ratio of a photon of wavelength 3000 Å and 6000 Å is– **2 : 1**	**BCECE-2007**
The increasing order of wavelength for He^+ ion, neutron (n) and electron (e) particles, moving with the same velocity is– $\lambda_{He^+} < \lambda_n < \lambda_e$	**BCECE-2016**
The relationship between energy (E) of wavelengths 2000 Å and 8000 Å, respectively is– **$E_1 = 4E_2$**	**BCECE-2016**
Equations represent de- Broglie relation– $\lambda = \frac{h}{mv}$	**CG PET -2008 WB-JEE-2008 J & K CET-(1999) AIIMS-1994**
The wavelength of associated wave of a particle moving with a speed of one-tenth that of light is 7Å. The particle must be– **Electron**	**CG PET -2017**
A gas absorbs photon of 355 nm and emits at two wavelengths. If one of the emission is at 680 nm, the other is at– **743 nm**	**[AIEEE-2011]**

Search on TG: @apna_pdf

@apna_pdf

For emission line of atomic hydrogen from $n_i = 8$ to $n_f = n$, the plot of wave number (ν) against $\left(\frac{1}{n^2}\right)$ will be (The Rydberge constant, R_H is in wave number unit)– **linear with slope R_H**	**[JEE Main 2019, 9 Jan Shift-I]**
The de Broglie wavelength of particle is– **Inversely proportional to its momentum**	**J & K CET-(2012)**
If the de-Broglie wavelength of a particle of mass m is 100 times its velocity, then its value in terms of its mass (m) and planck's constant (h) is– **$10\sqrt{\frac{h}{m}}$**	**J & K CET-(2009)**
The de-Broglie wavelength of helium atom at room temperature is– **7.34×10^{-11} m**	**JCECE - 2013**
Dual nature of particle was given by– **de-Broglie equation**	**J&K CET (2010) JIPMER-2005**
The number of photons emitted per second by a 60 W source of monochromatic light of wavelength 663 nm is ($h = 6.63 \times 10^{-34}$ Js)– **2×10^{20}**	**Kerala-CEE-2009**
The relationship between the energy E_1 of the radiation with a wavelength 8000 Å and the energy E_2 of the radiation with a wavelength 16000 Å is– **$E_1 = 2E_2$**	**Kerala-CEE-2005**
The de Broglie wavelength of the matter wave associated with an object dropped from a height x, when it reaches the ground is proportional to– **$\frac{1}{\sqrt{x}}$**	**Kerala-CEE-2020**
The energies E_1 and E_2 of two radiations are 25 eV and 50 eV respectively. The relation between their wavelengths i.e. λ_1 and λ_2 will be– **$\lambda_1 = 2\lambda_2$**	**NEET-2011**
Time period of a wave is 5×10^{-3} sec what is the frequency– **2×10^2 s^{-1}**	**UPTU/UPSEE-2008**
If the uncertainty in velocity of a moving object is 1.0×10^{-6} ms^{-1} and the uncertainty in its position is 58 m, The mass of this object is approximately equal to that of– **electron** ($h = 6.626\times10^{-34}$ Js)	**AP EAMCET (Medical) - 2013**
If the uncertainty in momentum and uncertainty in the position of a particle are equal. then the uncertaintiy in its velocity would be given by– **$\Delta v \geq \frac{1}{2m}\sqrt{\frac{h}{\pi}}$**	**AP EAPCET 24.08.2021, Shift-I CG PET -2019**
Both the position and exact velocity of an electron in an atom cannot be determined simultaneously and accurately. This is known as– **Heisenberg uncertainty principle**	**TS-EAMCET 09.08.2021, Shift-I**
Heisenberg's uncertainty principle is in general significant to– **Micro particles having a very high speed**	**TS EAMCET 04.08.2021, Shift-I**
The Heisenberg uncertainty principle may be stated as– **$\Delta x.\Delta v \geq h/4\pi m$**	**WB-JEE-2012, AMU-2004**
The de Broglie wavelength of an electron in the 4th Bohr orbit is– **$8\pi a_0$**	**[JEE Main 2020, 9 Jan Shift-I]**
The energy of a photon is 3×10^{-12} erg. Its wavelength in nm is – **662**	**JCECE - 2009**
The de-Broglie wavelength of a particle with mass 1 kg and velocity 100 m/s is– **6.6×10^{-36} m**	**JIPMER-2008, JCECE - 2007 AP-EAMCET (Engg.) 1997, 1996 AP – EAMCET - (Medical)-1997 NEET-1999**
Uncertainty principle is valid for– **Proton**	**Kerala-CEE-2017**
The ratio of de-Broglie wavelengths for electrons accelerated through 200 V and 50 V is– **1 : 2**	**Manipal-2020**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

If uncertainty in position and velocity are equal, then uncertainty in momentum will be– $\frac{1}{2}\sqrt{\frac{mh}{\pi}}$	**Manipal-2018**
If uncertainty in position and momentum are equal, then uncertainty in velocity is– $\frac{1}{2m}\sqrt{\frac{h}{\pi}}$	**NEET-2008**
If E_e, E_α and E_p represent the kinetic energies of an electron, α-particle and a proton respectively each moving with same de-Broglie wavelength then– **$E_e > E_p > E_\alpha$**	**UP CPMT-2011**
Series of lines is found in the UV region of atomic spectrum of hydrogen– **Lyman**	**AP-EAMCET-1991**
Among the first lines of Lyman, Balmer, Paschen and Brackett series in hydrogen atomic spectra, the highest energy has – **Lyman**	**AP-EAMCET-1999**
The values of n_1 and n_2 for the 2nd line in the Lyman series of hydrogen atomic spectrum is – **1 and 3**	**AP-EAMCET-2000**
The wavelength of spectral line emitted by hydrogen atom in the Lyman series is $\frac{16}{15R}$ cm. The value of n_2 (R=Rydberg constant)– **4**	**AP-EAMCET-2007**
The ratio of the highest to the lowest wavelength of Lyman series is– **4 : 3**	**TS-EAMCET (Engg.) 05.08.2021 Shift-II**
Extracted through alloy formation– **Silver**	**SCRA - 2009**
The spectrum of Helium is expected to be similar to that of– **Li^+**	**AP EAPCET 19-08-2021 Shift-I** **NEET-1998**
Electron transitions in the H-atom will release the largest amount of energy– **n=2 to n=1**	**COMEDK-2012**
The first emission line on hydrogen atomic spectrum in the Balmer series appears at (R = Rydberg constant)– $\frac{5R}{36}$ **cm^{-1}**	**AP-EAMCET (Medical), 2006** **AP EAMCET (Medical) - 1998** **AP-EAMCET (Engg.) - 1998**
The values of n_1 and n_2 respectively for H_β line in the Lyman series of hydrogen atomic spectrum are– **1 and 3**	**AP-EAMCET (Medical), 2006**
The frequency of light emitted for the transition n = 4 to n = 2 of He^+ is equal to the transition in H atom corresponding– **n = 2 to n = 1**	**AIEEE-2011**
Orbitals will have zero probability of finding the electron in the yz plane– **p_x**	**WB-JEE-2010**
$\left({}_{32}Ge^{76}, {}_{34}Se^{76}\right)$ and $({}_{14}Si^{30}, {}_{16}S^{32})$ are examples of– **isobars and isotones**	**WB-JEE-2014**
${}_{19}K^{40}$ and ${}_{20}Ca^{40}$ are known as– **isobars**	**UP CPMT-2002**
O_2 and O_3 are– **allotropes**	**UP CPMT-2010**
An isobar of ${}_{20}Ca^{40}$ is– **${}_{18}Ar^{40}$**	**MHT CET-2008**
Isotones have– **same number of neutrons**	**UP CPMT-2010**
Isoelectronic is– **CN^-, CO**	**NEET-2002**
Cl^-, Ar, Ca^{2+}, Ti^{4+} clement represents is– **Isoelectronic sequence**	**AP-EAMCET (Medical), 2006**

Search on TG: @apna_pdf

@apna_pdf

Hydrogen Atom

If the radius of the 3rd Bohr's orbit of hydrogen atom is r_3 and the radius of 4th Bohr's orbit is r_4. Then:– **$r_4 = \frac{16}{9} r_3$**	**JEE Main-26.06.2022, Shift-I**
The hydrogen line spectrum provides evidence for the– **Quantized nature of atomic energy states**	**SCRA-2012**
The energy of an electrons in the 3rd orbit of an atom is –E. The energy of an electron in the first orbit will be– **–9E**	**MPPET- 2009**
The velocity of an electron in the first Bohr orbit is v_1. Its velocity in the third Bohr's orbit is– **$v_1/3$**	**SCRA-2010**
The energy of the electron in the hydrogen atom is given by the expression :– **$\frac{-2\pi^2 Z^2 e^4}{n^2 h^2}$**	**AP-EAMCET-1991**
The basic assumption of Bohr's model of hydrogen atom is that : **the angular momentum of the electron is quantised**	**AP-EAMCET-1994**
The radius of the second Bohr's orbit is :– **0.212 nm**	**AP-EAMCET-1995**
In the Bohr hydrogen atom, the electronic transition emiting light of longest wavelength is:– **n = 4 to n = 3**	**AP-EAMCET-1997**
The energy of an electron present in Bohr's second orbit of hydrogen atom is :– **– 328 kJ mol^{-1}**	**AP EAMCET (Engg.) 2001**
An electron is moving in Bohr's fourth orbit. Its de-Broglie wavelength is λ. The circumference of the fourth orbit is– **4λ**	**VITEEE-2014**
The energy (in ev) associated with the electron in the 1st orbit of Li^{2+} is– **– 122.4**	**TS-EAMCET (Engg.), 07.08.2021 Shift-II**
If the wavelength of the first line of Balmer series is 656 nm, then the wavelengths of its second line and limiting line respectively are ——— **485.9 nm & 364.4 nm**	**AP EAPCET 25.08.2021, Shift-II**
The electron in the hydrogen jump on absorbing 12.75 eV of energy would jump to ____orbit– **4**	**AP EAPCET 24.08.2021 Shift-II**
On the basis of Bohr's model. The radius of the 3rd orbit is– **9 times the radius of 1st orbit**	**AP EAPCET 19-08-2021 Shift-I**
Energy associated with the first orbit of He^+ is– **-8.72×10^{-18} joules**	**COMEDK-2015 AMU-2015**
Assuming Rydberg constants are equal, the ground state energy of the electron in hydrogen atom is equal to– **the first excited state energy of the electronic He^+**	**COMEDK-2020**
The wavelength (in Å) of an emission line obtained for Li^{2+} during an electronic transition from $n_2 = 2$ to $n_1 = 1$ is (R = Rydberg constant)– **$\frac{4}{27R}$**	**AP-EAMCET (Medical), 2008**
The ratio of potential energy (PE) and total energy of an electron in a Bohr orbit of the hydrogen atom is– 2	**TS-EAMCET 09.08.2021, Shift-I**
The maximum energy is possessed by an electron, when it is present– **at infinite distance from the nucleus**	**AIIMS-1996**
In second orbit of H atom the velocity of e^- is:– **10.9×10^5 m/sec**	**AIIMS-27 May, 2018 AIIMS-2001**
In hydrogen atomic spectrum, a series limit is found at 12186.3 cm^{-1}. Then, it belongs to– **Paschen series**	**AIIMS-2014**
If velocity of an electron in the first Bohr orbit of H is v_1 then velocity in second orbit will be– **$\frac{v_1}{2}$**	**SRMJEEE – 2007**
If the energy of an electron in the second Bohr orbit of H-atom is –E, the energy of the electron in the Bohr's first orbit is– **–4E**	**SRMJEEE – 2010**
In a hydrogen atom, the electron is at a distance of 4.768 Å from the nucleus. The angular momentum of the electron is– **$\frac{3h}{2\pi}$**	**AP- EAMCET(Medical) - 2010**

TEAM SDK

Search on TG: @apna_pdf

@apna_pdf

According to Bohr's theory, the angular momentum for an electron of 3rd orbit is– **$3\hbar$**	**VITEEE 2014**
In the hydrogen transition spectrum would have the same wavelength as the Balmer transition, n = 4 to n = 2 of He^+ spectrum– **n = 2 to n = 1**	**VITEEE-2013**
The degeneracy of the level of H-atom that has energy $\left(-\frac{R_H}{9}\right)$ is– **9**	**VITEEE 2013**
The energy of electron in n^{th} orbit of hydrogen atom is– $-\frac{13.6}{n^2}$ **eV**	**AMU EXPLORER-2002 Karnataka-CET-2016**
The spectrum of H^+ is expected to be similar to that of– **He^+**	**AMU EXPLORER-2002**
The ratio of energy of the electron in ground state of hydrogen to the electron in first excited state of Be^{3+} is– **1 : 4**	**Assam CEE-2014**
The energy of an electron in second Bohr orbit of hydrogen atom is– **-5.44×10^{-19} J**	**AIIMS 26 May 2019 (Evening) BITSAT 2017 BCECE-2010**
The wave number of the spectral line in the emission spectrum of hydrogen will be equal to 8/9 times the Rydberg's constant if the electron jumps from– **n = 3 to n = 1**	**BCECE-2014**
The wave number of the limiting line in Lyman series of hydrogen is 109678 cm^{-1}. The wave number of the limiting line in Balmer series of He^+ would be:– **109678 cm^{-1}**	**BITSAT-2014**
If the radius of H is 0.53 Å, then the radius of $_3Li^{2+}$ is– **0.17 Å**	**BITSAT-2012**
The first emission line in the atomic spectrum of hydrogen in the Balmer series appears at– $\frac{5R}{36}$ **cm^{-1}**	**BITSAT-2016**
Bohr's radius of 2^{nd} orbit of Be^{3+} is equal to that of– **first orbit of hydrogen**	**CG PET -2009**
The radius of the second Bohr orbit in terms of the Bohr radius, a_0, in Li^{2+} is– $\frac{4a_0}{3}$	**[JEE Main 2020, 8 Jan Shift-II]**
Bohr model of hydrogen atom was unable to explain– **Heisenberg's uncertainty principle**	**J & K CET-(2012)**
Energy of one mole of photons of radiation whose frequency is 5×10^{14} Hz is– **199.51 kJ mol^{-1}**	**J & K CET-(2014)**
The value of Rydberg constant is– **109678 cm^{-1}**	**J & K CET-(2007)**
The wavelength of a spectral line in Lyman series, when electron jumping back to 2^{nd} orbit, is– **1216**	**J & K CET-(2007)**
The value of n_1 in the relationship is $\frac{1}{\lambda} = R_H\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$ is correct when $n_2 > n_1$ corresponds to Paschen lines in the Hydrogen spectrum– **3**	**J & K CET-(2001)**
Transition from n=4, 5, 6 to n = 3 in hydrogen spectrum gives– **Paschen series**	**J & K CET-(2000)**
The expression of angular momentum of an electron in a Bohr's orbit is:– $\frac{nh}{2\pi}$	**JCECE - 2003**
Ratio of kinetic energy of hydrogen and helium gas at 300 K is :– **1 : 1**	**JCECE - 2006**
When an electron in hydrogen spectrum jumps from n = 7 to n = 2, the total number of spectral lines possible are– **15**	**JCECE - 2016**
An electron is moving in Bohr's fourth orbit. Its de-Broglie wave length is λ. The circumference of the fourth orbits is– **4λ**	**JIPMER-2014**
The ratio of the difference in energy between the first and the second Bohr orbit to that between the second and the third Bohr orbit is– **27/5**	**JIPMER-2012**
Ratio of radii of second and first Bohr orbits of H atom is– **4**	**JIPMER-2005**
The number of waves formed by a Bohr electron in one complete revolution in its second orbit is– **Two**	**JIPMER-2016**

Search on TG: @apna_pdf

@apna_pdf

If the energies of the two photons in the ratio of 3 : 2, their wavelength will be in the ratio of– **2 : 3**	**Karnataka-CET-2011**
The radius of the first Bohr orbit of hydrogen atom is 0.529Å. The radius of the third orbit of H^+ will be– **4.29Å**	**Kerala-CEE-2007**
The ratio of frequency corresponding to the third line in Lyman series of hydrogen atomic spectrum to that of the first line in Balmer series of Li^{2+} spectrum is– $\frac{3}{4}$	**Kerala-CEE-2012**
The shortest wavelength of the line in hydrogen atomic spectrum of Lyman series when $R_H = 109678\ cm^{-1}$ is– **911.7 Å**	**Kerala-CEE-2014**
In the hydrogen atom spectrum, the emission of the least energetic photon taken place during the transition from n= 6 energy level to n = ...energy level.– **5**	**Kerala-CEE-2016**
The energy of an electron is the 3s orbital (excited state) of H – atom is– **–1.5eV**	**Kerala-CEE-2017**
In the atomic spectrum of hydrogen, the spectral lines pertaining to electronic transition of n = 4 to n = 2 refers to :– **Balmer series**	**Manipal-2018**
If r is the radius of the first orbit, the radius of n^{th} orbit of H-atom is given by– rn^2	**NEET-1988**
The energy of an electron in the n^{th} Bohr orbit of hydrogen atom is– $-\frac{13.6}{n^2}$ eV	**NEET-1992**
The modified Bohr's theory by introduction elliptical orbits for electrons path– **Sommerfeld**	**NEET-1999**
The energy of second Bohr orbit of the hydrogen atom is –328 kJ mol^{-1}. hence the energy of fourth Bohr orbit would be– **–82 kj mol^{-1}**	**NEET-2005**
Number of spectral lines of Lyman series of electron when it jumps from 6 to first level (in Lyman series), is– **15**	**UP CPMT-2009**
The wave number of 4^{th} line in Balmer series of hydrogen spectrum is– (R = 1,09,677 cm^{-1})– **24,372 cm^{-1}**	**UP CPMT-2008**
The energy of second Bohr orbit of the hydrogen atom is – 328 kJ mol^{-1}; hence the energy of fourth Bohr orbit would be– **–82 kJ mol^{-1}**	**UPTU/UPSEE-2007**
The wavelength of the radiation emitted, when in a hydrogen atom electron falls from infinity to stationary state, would be (Rydberg constant = $1.097 \times 10^7\ m^{-1}$)– **91 nm**	**UPTU/UPSEE-2007**
The radius of hydrogen atom in the ground state is 0.53Å.The radius of Li^{2+} ion (atomic number = 3) in a similar state is:– **0.176Å**	**UPTU/UPSEE-2014, 2005**
For a Bohr atom angular momentum M of the electron is : (n=0,1,2,....)– $\frac{nh}{2\pi}$	**UPTU/UPSEE-2005**
The ratio of the difference in energy between the first and second Bohr orbit to that between the second and third Bohr orbit is– $\frac{27}{5}$	**UPTU/UPSEE-2013**
An electron from one Bohr stationary orbit can go to next higher orbit– **by absorption of electromagnetic radiation of particular frequency**	**UPTU/UPSEE-2008**
For the Paschen series the values of n_1 and n_2 in the expression $\Delta E = R_H c\left(\frac{1}{n_1^2}-\frac{1}{n_2^2}\right)$– **$n_1$=3,$n_2$=4,5,6,…**	**WB-JEE-2009**
In Sommerfeld's modification of Bohr's theory, the trajectory of an electron in a hydrogen atom is– **a perfect ellipse**	**WB-JEE-2010**
The electronic transitions from n = 2 to n = 1 will produce shortest wavelength in (Where n = principal quantum state)– **Li^{2+}**	**WB-JEE-2011**
The energy of an electron in first Bohr orbit of H-atoms is 13.6 eV. the possible energy value of electron in the excited state of Li^{2+} is– **–30.6 eV**	**WB-JEE-2011**
The emission spectrum of hydrogen discovered first and the region of the electromagnetic spectrum in it belongs, respectively are– **Balmer, visible**	**WB-JEE-2014**

TEAMSN

Search on TG: @apna_pdf

@apna_pdf

The time taken for an electron to complete one revolution in Bohr orbit of hydrogen atom is– **$\frac{4\pi^2 mr^2}{nh}$**	**WB-JEE-2016**
The ratio of the shortest wavelength of two spectral series of hydrogen spectrum is found to be about 9. The spectral series are– **Lyman and Paschen**	**[JEE Main 2019, 10 April Shift-II]**
The shortest wavelength of H atom in the Lyman series is λ_1. The longest wavelength in the Balmer series of He^+ is– **$\frac{9\lambda_1}{5}$**	**[JEE Main 2020, Sep Shift-II]**
The values of n_1 and n_2 respectively for H_β line in the Lyman series of hydrogen atomic spectrum 44 are– **1 and 3**	**JIPMER-2009**
X-rays are electromagnetic radiation whose wavelengths are of the order of:– **10^{-10} metre**	**NDA (II)-2015**
The shortest wavelength in hydrogen spectrum of Lyman series when R_H = 109678 cm^{-1}, is– **911.7Å**	**Kerala-CEE-2010**
The longest wavelength line in Balmer series of spectrum is– **656 nm**	**NEET-1996**
The wave number of hydrogen atom in Lymen series is 82200 cm^{-1}. The electron goes from– **$n_2 \rightarrow n_1$**	**UPTU/UPSEE-2013**
Splitting of spectrum lines in magnetic field is– **Zeeman effect**	**UPTU/UPSEE-2008**
In hydrogen spectrum, the series of lines appearing in ultra violet region of electromagnetic spectrum are called :– **Lyman lines**	**Manipal-2017**
Towards quantum mechanical model of the atom.	
The electronic configuration of Pt (atomic number 78) is– **[Xe] $4f^{14}$ $5d^9$ $6s^1$**	**JEE Main-29.06.2022, Shift-I**
The number of nodal planes present in *s antibonding orbitals is– **1**	**Karnataka-CET, 2008**
Mg^{2+} is isoelectronic with– **Na^+**	**Karnataka-CET-2007**
How many electrons are present in the M shell of the atom of an element with atomic number 24– **13**	**AP-EAMCET (Med.)-1999**
The symbol of the element 'Tungeston' is– **W**	**NDA (II)-2015**
Electronic configuration of potassium is– **$1s^2,2s^2,2p^6,3s^2,3p^6,4s^1$**	**AP EAMCET- 1992**
Chlorine atom, in its third excited state, reacts with fluorine to form a compound X. The formula and shape of X are– **ClF_7, pentagonal bipyramidal**	**AP EAMCET- 2003**
The electronic configuration of curium (Z = 96) is– **[Rn] $5f^7$ $6d^1$ $7s^2$**	**JHARKHAND – 2019**
The number of unpaired electrons in carbon atom is– **Two**	**MPPET- 2009**
In the change of NO^+ to NO, the electron is added to a– **π^* orbital**	**SCRA 2010**
The maximum number of electrons that can be accommodated in all the orbitals for l = 3, is– **14**	**AP-EAMCET-1991**
The rule that explains the reason for chromium to have [Ar] $3d^5$, $4s^1$ configuration instead of [Ar] $3d^4$, $4s^2$, is– **Hund's rule**	**AP-EAMCET-1996**
The electronic configuration of sodium is– **[Ne] $3s^1$**	**AP-EAMCET-1999**
In the ground state, an element has 13 electrons in M shell. The element is– **Chromium**	**AP-EAMCET-2001**
If the electron of a hydrogen atom is present in the first orbit, the total energy of the electron is– **$\frac{-e^2}{2r}$**	**AP-EAMCET-2003**
Elements have least number of electrons in its M shell– **K**	**AP-EAMCET-2004**
The atomic numbers of elements X, Y and Z are 19, 21 and 25 respectively. The number of electrons present in the M shell of these elements, the order is– **Z > Y > X**	**AP-EAMCET-2005**
The maximum number of sub-levels, orbitals and electrons in N shell of an atom are respectively– **4, 16, 32**	**AP-EAMCET-2007**
Orbital has zero radial nodes and 2 angular nodes– **3d**	**AP EAPCET 23-08-2021 Shift-I**

Search on TG: @apna_pdf

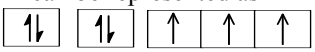
@apna_pdf

Pair are the ions isoelectronic– **Na^-, O^{2-}**	**NDA (I)-2019**
The element with the electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$ is– **Cu**	**TS-EAMCET-2016**
The number of unpaired electrons in Co^{2+}, is– **3**	**TS-EAMCET (Engg.), 07.08.2021 Shift-II**
$[Ar]3d^{10}4s^1$ electronic configuration belongs to– **Cu**	**MPPET-2008**
The electronic configuration of Cs is – **$[Xe]6s^1$**	**AP EAMCET (Engg.) 21.09.2020, Shift-II**
The element with atomic number 12 belongs to ..... group and ..... period– **II A, third**	**AP EAMCET (Engg.) 2001**
Electronic configuration of X is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^1$. It belongs to– **thirteenth group and third period**	**COMEDK-2017**
An orbital with n=3, ℓ=1 is designated as– **3p**	**COMEDK-2014**
The total number of orbitals in the fifth energy …….is– **25**	**AP-EAMCET (Medical), 2006**
The atomic number of an element is 35. What is the total number of electrons present in all the p-orbitals of the ground state atom of that element– **17**	**AP-EAMCET (Medical), 2003**
The total number of electrons present in all the 's' orbitals, all the 'p' orbitals and all the 'd' orbitals of cesium ion are respectively– **10, 24, 20**	**AP-EAMCET (Medical), 2003**
An orbital with one angular node shows three maxima in its radial probability distribution curve, the orbital– **4p**	**TS EAMCET 05.08.2021, Shift-I**
Spectrum of Li^{2+} is similar to that of– **H**	**AIIMS-2002**
Element is represented by electronic configuration– $1s^2 2s^2 2p_x^1\ 2p_y^1 2p_z^1$ **Nitrogen**	**AIIMS-2001**
The outermost configuration of most electronegative element is– **$ns^2\ np^5$**	**AIIMS-2000**
The configuration **$1s^2, 2s^2\ 2p^5, 3s^1$** shows:– **Excited state of neon atom**	**AIIMS-1997**
Transition metal elements exhibit general electronic configuration– **$ns^{1-2}\ (n-1)\ d^{1-10}$**	**AP- EAPCET- 07-09-2021, Shift-I**
The atomic number of an element 'M' is 26. How many electrons are present in the M-shell of the element in its M^{3+} state– **13**	**AP - EAMCET (Medical) - 2007**
The orbital angular momentum of an electron in 2p orbital is– **$\sqrt{2}$ h/2 π**	**Assam CEE-2019**
The orbital angular momentum of a p-electron given as– **$\frac{h}{\sqrt{2}\pi}$**	**NEET-Mains 2012**
Orbital having 3 angular nodes and 3 total nodes to– **4f**	**Odisha NEET-2019**
The number of radial nodes of 3s and 2p orbitals are respectively– **2, 0**	**BITSAT-2017**
The element whose electronic configuration is $1s^2\ 2s^2\ 2p^6\ 3s^2$ is a– **metal**	**AMU-2004**
The electronic configuration of P in H_3PO_4– **$1s^2 2s^2, 2p^6, 3s^2 3p^6$**	**CG PET- 2011**
The pair having the similar shape is– **BF_4^- and NH_4^+**	**CG PET- 2011**
Quantum numbers ℓ = 2and m = 0 represent the orbital– **d_{z^2}**	**CG PET- 2016**
Electronic configuration of H^+ is– **$1s^0$**	**CG PET- 2010**
The electronic configuration of bivalent europium and trivalent cerium are (atomic number : Xe = 54, Ce = 58, Eu = 63)– **$[Xe]4f^7$ and $[Xe]4f^1$**	**(JEE Main 2020, 9 Jan Shift-I)**
In the sixth period, the orbitals that are filled are– **6s, 4f, 5d, 6p**	**(JEE Main 2020, 5 Sep Shift-I)**
Outermost electronic configuration of a group-13 element E is $4s^2\ 4p^1$. The electronic configuration of an element of p-block period-five placed diagonally to element, E is– **$[Kr]4d^{10}5s^2 5p^2$**	**(JEE Main 2021, 20 July Shift-II)**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

According to Aufbau principle, the order of energy of 3d, 4s and 4p orbitals is– **4s <**	**J & K CET-(2006)**
Electronic configuration of deuterium atom is– **$1s^1$**	**J & K CET-(2005)**
Two nodal planes are present in– **$\pi^* 2p_x$**	**J & K CET-(2004)**
Ground state electronic configuration of nitrogen atom can be represented as– 	**J & K CET-(2003)**
A 3p-orbital has– **one spherical and one non-spherical node**	**J & K CET-(1998)**
The element with the electronic configuration as [Ar] $3d^{10}4s^2 4p^3$ represents a– **metalloid**	**JCECE - 2010**
The electronic configuration of element with atomic number 24 is– **$1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^5, 4s^1$**	**JCECE - 2010**
The outermost electronic configuration of the most electronegative element is– **$ns^2 np^5$**	**JCECE - 2014**
If n=6, the sequence for filling of electrons will be.– **ns →(n-2) f→(n-1)d→np**	**JIPMER-2014**
The total number of orbitals in the fifth energy level is– **25**	**JIPMER-2009 UP CPMT-2008**
The orbital nearest to the nucleus is– **4s**	**Karnataka-CET-2018**
The number of naturally occurring p-block elements that are diamagnetic is– **18**	**Karnataka-CET-2011**
The number of spherical nodes in 3p orbitals are/is– **one**	**NEET-1988**
The orientation of an atomic orbital is governed by– **magnetic quantum number**	**NEET-2006**
The total number of atomic orbitals in fourth energy level of an atom is– **16**	**NEET-2011 UPTU/UPSEE-2004**
The stable electronic configuration of chromium is– **$3d^5\ 4s^1$**	**J & K CET-(2007)**
The ground state term symbol for an electronic state is governed by:– **Hund's rule**	**UPTU/UPSEE-2004**
The electronic configuration of the oxide ion is much most similar to the electron configuration of the– **nitride ion**	**UPTU/UPSEE-2009**
The electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9$ represents a– **Metallic cation**	**WB-JEE-2008**
The number of unpaired electrons in Ni (atomic number = 28) are– **2**	**WB-JEE-2018**
For n=3 energy level the number of possible orbitals (all kinds) are– **9**	**CG PET -2005**
The number of radial nodes for 4p is– **2**	**SCRA-2015**
The magnetic quantum number m for the outermost electron in the Na atom is– **0**	**AP-EAMCET-1991**
"No two electrons in an atom can have the same set of all four quantum numbers". This principle of called– **Pauli's exclusion principle**	**AP EAMCET (Engg.) 18.09.2020, Shift-I**
How many emission spectral lines are possible when hydrogen atom is excited to nth energy level– **$\frac{(n-1)n}{2}$**	**TS EAMCET-2017**
A subshell n = 3, l = 2 can accommodate maximum of_____– **10 electrons**	**AP EAPCET 20.08.2021 Shift-II**
The number of angular and radial nodes of 4d orbital respectively are– **2, 1**	**AP EAMCET (Engg.) -2014**
An electron having spin quantum number, s = –1/2 and magnetic quantum number, m=+3 can be present in– **f-orbital only**	**COMEDK-2012**
The number of radial nodes in 3s and 2p orbitals, respectively are– **2 ; 0**	**TS-EAMCET (Engg.), 06.08.2021**
The orbital with 4 radial and 1 angular nodes is– **$6p_z$**	**TS EAMCET 05.08.2021, Shift-I**
The orbital having two radial as well as two angular nodes is:– **5d**	**JEE Main 26.02.2021, Shift-I**
With increasing Principal Quantum number, the energy difference between adjacent energy levels in H-atom_____– **Decreases**	**AP EAPCET 20.08.2021 Shift-II**
The maximum number of electrons, present in an orbit that is represented by azimuthal quantum number (l) = 3, will be– **14**	**AIIMS-1996**
Azimuthal quantum number defines– **angular momentum of electron**	**AIIMS-2002**

Search on TG: @apna_pdf

@apna_pdf

The quantum number 'm' of a free gaseous atom is associated with:– **the spatial orientation of the orbital**	**AIIMS-1998**
For principle quantum number n=4, the total number of orbitals having l=3 is:– **7**	**AIIMS-2004**
Quantum numbers of an atom can be defined on the basis of– **Pauli's exclusion principle**	**AIIMS-2002**
The total number of orbitals in a shell with principal quantum number 'n' is:– **n^2**	**AIIMS-1997**
The number of angular and radial nodes of 4d orbital respectively are– **2, 1**	**AP-EAMCET (Engg.) - 2014**
The values of four quantum numbers of valence electron of an element are n = 4, l = 0, m = 0 and **$s = +\frac{1}{2}$.** The element is :– **K**	**AP-EAMCET (Engg.)-2004**
The number of radial nodes of 3s and 2p orbitals respectively are– **2, 0**	**AP-EAMCET (Engg.) 2013**
With increase in principal quantum number n, the energy difference between adjacent energy levels in hydrogen atom– **decreases**	**AP - EAMCET(MEDICAL) - 2009**
The Balmer series in atomic hydrogen is observed in the spectral region– **visible**	**AMU-2014**
For the 19^{th} electron of K the values of quantum number will be– **4, 0, 0, $+\frac{1}{2}$**	**AMU-2010**
An electron with values 4,1,0 and +1/2 for the set of four quantum numbers n, l, m_l and m_s respectively, belongs to– **4p - orbital**	**AMU-2006**
An electron with values 4, 2,–2 and +1/2 for the set of four quantum numbers n, l, m_l and m_s, respectively, belongs to– **4d-orbital**	**AMU-2005**
The ion that is isoelectronic with CO is– **CN^-**	**Assam CEE-2018 UP CPMT-2012 JCECE - 2006 J & K CET-(1998) NEET-1997**
Azimuthal quantum number determines the– **angular momentum of orbitals**	**BCECE-2011**
An e^- has magnetic quantum number as –3, its principal quantum number is – **4**	**BITSAT 2016**
A particle of mass nearly equal to proton is moving with a velocity nearly equal to the velocity of light. The wavelength of wave associated with it is– **directly proportional to its velocity**	**CG PET -2018**
The number of orbitals associated with quantum number n = 5, $m_s = +\frac{1}{2}$ is– **25**	**[JEE Main 2020, 7 Jan Shift-I]**
The number of subshells associated with n = 4 and m = –2 quantum number is– **2**	**[JEE Main 2020, 2 Sep Shift-II]**
Maximum number of electrons in a shell principle quantum number n is given by– **$2n^2$**	**J & K CET-(2012)**
The total number of orbitals associated with the principal quantum number n = 3, is– **9**	**J & K CET-(2014)**
The number electrons accommodated in an orbit with principal quantum number 2 is– **8**	**J & K CET-(2007)**
The total number of orbital's possible for principal quantum number n is– **n^2**	**J & K CET-(2004)**
The maximum number of electrons in all those orbitals for principal quantum number is 3 and azimuthal quantum number 2, is– **10**	**J & K CET-(1997)**
The shape of the orbital with the value of *l* =2 and m = 0 is– **dumb-bell**	**JCECE - 2009**
The orbital angular momentum of an electron is 2s orbital is– **zero**	**JCECE - 2015**
The shape of an orbital is determined by– *l*	**JIPMER-2004**
Azimuthal quantum number (*l*) defined– **shape of orbitals**	**JIPMER-2019**
The set of quantum number for the unpaired electrons of chlorine atom is– **3,1,1, ±**	**Karnataka-CET-2017**
The set of four quantum numbers for the outermost electron of sodium (Z = 11) is– **3, 0, 0, $\frac{1}{2}$**	**Karnataka-CET-2012**

TEAM SPM

Search on TG: @apna_pdf

The set of quantum numbers for the outermost electron for copper in its ground state is– **4, 0, 0, $+\frac{1}{2}$**	**Karnataka-CET, 2010**
The set of four quantum number for outermost electron of potassium (Z = 19) is– **4,**	**Karnataka-CET, 2009**
The azimuthal quantum number has the value of 2, the number of orbitals possible are– **5**	**Karnataka-CET, 2008**
The number of angular and radial nodes in 3p orbital respectively are– **1, 1**	**Kerala-CEE-29.08.2021 Karnataka-CET-2021**
The number of electrons with azimuthal quantum number $l = 1$ and $l = 2$ for Cr in ground state respectively are– **12, 5**	**Kerala-CEE-2015**
The magnetic quantum number for d-orbital is given by :– **0, ±1, ±2**	**Manipal-2019**
For f-orbital the values of m are :– **–3, –2, –1, 0, +1, +2, +3**	**Manipal-2017**
The orbital angular momentum of an electron in 'f' orbital is– **$\frac{\sqrt{3}h}{\pi}$**	**MHT CET-2014**
The maximum number of electrons in a subshell is given by the expression– **$4l + 2$**	**NEET-1989**
The total number of electrons that can be accommodated in all the orbitals having principal quantum number 2 and azimuthal quantum number l are– **6**	**NEET-1990**
For azimuthal quantum number $l = 3$, the maximum number of electrons will be– **14**	**NEET-1991**
If n = 6, the sequence for filling of electrons will be– **ns → (n-2)f → (n-1)d → np**	**NEET-2011**
Maximum number of electrons in a subshell of an atom is determined by– **$4l + 2$**	**NEET-2009**
The angular momentum of electron in 'd' orbital is equal to– **$\sqrt{6}\frac{h}{2\pi}$**	**NEET-2015, cancelled**
The maximum number of orbital's that can be identified with the quantum numbers are n= 3, l =1, m_l = 0– **1**	**NEET-2014**
The maximum numbers of electrons that can be associated with the set of quantum numbers are n = 3, l = 1 and m = –1 **2**	**NEET-2013**
Two electrons occupying the same orbital are distinguished by– **spin quantum number**	**NEET-I 2016**
Maximum number of electrons in a subshell with $l = 3$ and n = 4 is– **14**	**NEET-2012**
The set of quantum number for 19th electron of chromium (Z = 24) is– **4, 0, 0, $+\frac{1}{2}$**	**UP CPMT-2011**
No two electron can have the same values of …..quantum numbers.– **Four**	**UPTU/UPSEE-2004**
'No two electrons in an atom can have the same set of quantum numbers.' This principle is known by– **Pauli's exclusion principle**	**UPTU/UPSEE-2011**
The difference between orbital angular momentum of an electron in a 4f-orbital and another electron in a 4s-orbital is– **$2\sqrt{3}$**	**WB-JEE-2020**
Wave nature of electrons was demonstrated by– **Davisson and Germer**	**UP CPMT-2004 J & K CET-(1999)**
The observation that the ground state of nitrogen atom has 3 unpaired electrons in its electronic configuration and not otherwise is associated with:– **Hund's rule of maximum multiplicity**	**JCECE - 2005**
The scientist who proposed the atomic model based one the quantization of energy for the first time was– **Neils Bohr**	**J & K CET-(2008)**
The quantum theory for the first time to explain the structure of satom by– **Bohr**	**J & K CET-(2005)**
The Pauli exclusion principle applies to– **H^-**	**Manipal-2016**

Search on TG: @apna_pdf

@apna_pdf

3. Chemical Thermodynamics

Thermodynamic Terms and Applications, Measurement of ΔU and ΔH Calorimetry

- The state function is an extensive property of system is– **Volume**
- A cup of tea placed in the room eventually acquires rom temperature by losing heat. The process may be considered close to– **Reversible process**
- A thermally isolated gaseous system can exchange energy with the surroundings. The mode of transference of energy can be– **Work**
- The expression for isothermal expansion of ideal gas is– $W_{rev} > W_{irr}$
- A well stoppered thermos flask contains some ice cubes. This is an example of– **Isolated system**
- A gas expands isothermally and reversibly, the work done by a gas is– **Maximum**
- 4L - atm is equal to– **96 cal**
- The ammonium chloride is dissolved in water, the solution becomes cold. The change is– **Endothermic**
- The internal energy of one mole of an ideal gas is– $\frac{3}{2}RT$
- Internal energy does not include– **Energy arising by gravitational pull**
- For the gaseous reaction ($N_2O_4 \rightarrow 2NO_2$)– **ΔH > ΔU**
- A monoatomic neon possesses– **Only potential energy**
- In a change from state A to state B– **ΔU depends only on the initial and final state**
- The heat of combustion of solid benzoic acid at constant vlume is –321.30 kJ at 27°C. The heat of combustion at constant pressure is– **–321.30 – 150 R**
- The heat absorbed in a reaction at constant temperature and constant volume is– **ΔU**
- For hypothetical reaction $A_{(g)} + B_{(g)} \rightarrow C_{(g)} + D_{(g)}$ is– **ΔH = ΔU**
- The value of ΔH for cooling 2 moles of an ideal monoatomic gas from 225°C to 125°C at constant pressure will be (Given, $C_p = 5R/2$)– **–500 R**
- The heat absorbed at constant volume is equal to the system's change in– **Internal energy**

Work Done & Enthalpy Change, ΔH of a Reaction

- The enthalpies of elements in their stadard states are taken as zero. The enthalpy of formation of a compound.– **may be positive or negative**
- Enthalpy of sublimation of a substance is equal to– **enthalpy of fusion + enthalpy of vaporisation**
- "X" gm of ethanal was subjected to combustion in a bomb calorimeter and the heat produced is "Y" Joules. Then– $\Delta U_{(combustion)} = -44Y/X$ J mol$^-$
- For an endothermic reaction, energy of activation is E_a and enthalpy of the reaction is ΔH (both of these in kJ/mol) minimum value of E_a will be– **More than ΔH**

Spontaneity, Entropy, Gibbs Energy Change and Equilibrium

- A reaction can occur spontaneously if– **TΔS > ΔH and both ΔH and ΔS are positive**
- The enthalpies of combustion of carbon and carbon monoxide are –393.5 and –283 kJ mol^{-1} respectively. The enthalpy of formation of carbon monoxide per mole is– **573 J**
- The relationship between standard free energy change in a reaction and the corresponding equilibrium constant K_c is– $-\Delta G° = RT\ln K_c$
- The intensive property is– **Mass/Volume**
- According to the second law of thermodynamics, a process (reaction) is spontaneous, if during the process– $\Delta S_{universe} > 0$
- The thermodynamics property provides a measures of randomness in the system?– **Entropy**
- According to third law of thermodynamics, the entropy at 0 K is zero for– **Perfectly crystalline solids**
- An ideal gas is allowd to expand under adiabatic conditions, the term zero for such a process is– **ΔS = 0**
- In any natural process is– **The entropy of universe tends towards maximum**
- The unit of entropy is– **JK^{-1} mol^{-1}**

TEAM SKY

Search on TG: @apna_pdf

@apna_pdf

- Entropy of system depends upon– **Temperature, pressure and volume**
- For the gaseous reaction, involving the complete combustion of isobutane– **$\Delta H > \Delta U$**
- For a hypothetical reaction $A + B \rightarrow C$ if $\Delta G^\circ > 0$– **A and B predominate in the reaction mixture**
- The conditions, for reaction will be always spontaneous– **$\Delta H < 0$ and $\Delta S > 0$**
- The for adiabatic expansion of ideal gas is– **PV^γ = constant**
- For a sample of perfect gas when its P is changed isothermally from P_i to P_f, the entropy change is given by– **$\Delta S = nR \ln\left(\frac{P_i}{P_r}\right)$**
- For an isothermal free expansion of an ideal gas into vacuum is– **$\Delta U = 0, q = 0, w = 0$**
- If the reaction achieves equilibrium at 298 K & one bar pressure i.e., standard conditions, then equilibrium constant is– **1**
- The heat of vaporisation & heat of fusion of H_2O are 540 cal/g & 80 cal/g. The ratio of $\frac{\Delta S_{vap}}{\Delta S_{fusion}}$ for H_2O is– **4.94**
- For a particular reversible reaction at temperature T, ΔH and ΔS were found to be both +ve. If T_e is the temperature at equilibrium, the reaction would be spontaneous when– **$T > T_e$**
- Equal volumes of two monoatomic gases, A and B, at same temperature and pressuer are mixed. The ratio of specific heats (C_P/C_V) of the mixture will be– **1.67**
- An ideal gas with $C_V = 3R$ expands adiabatically into a vacuum thus doubling its volume. The final temperature is given by– **T_2 T_1**
- One mole of an ideal gas at 450K is expanded isothermally & reversibly from an initial volume of 5L to 20L. Then, ΔU for the process is– **Zero**
- Thermodynamics is not concerned about– **the rate at reaction proceeds**
- The state of a gas can be described by quoting the relationship between:– **Pressure, volume, temperature, amount**
- The volume of gas is reduced to half from its original volume. The specific heat will be– **remain constant**
- During complete combustion of one mole of butane, 2658 kJ of heat is released. The thermo-chemcial reaction for above change is–

$$C_4H_{10}(g) + \frac{13}{2}O_2(g) \rightarrow 4CO_2(g) + 5H_2O(l);$$

$\Delta_cH = -2658.0$ kJ mol^{-1}

- Δ_rU^0 of formation of $CH_4(g)$ at certain temperature is –393 kJ mol^{-1}. The value of Δ_rH is– **$< \Delta_rU^0$**
- The pressure-volume work for an ideal gas can be calculated by using the expression $W = -\int_v p_{ex} dV$. The work can also be calculated from the pV – plot by using the area under compressed (a) reversibly or (b) irreversibly from volume V_i to V_f the– **W(reversible) < W (irreversible)**
- The right relationship between C_p and C_v for one mole of idal gas is– **$C_P - C_V = R$**
- For irreversible expansion of an ideal gas under isothermal condition, is– **[2021]** **$\Delta U = 0, \Delta S_{total} \neq 0$**
- For the reaction, $2Cl(g) \rightarrow Cl_2(g)$, is– **$\Delta_rH < 0$ and $\Delta_rS_{total} = 0$**
- Tea placed in thermos flask is an example of– **Isolated system**
- Gaseous system is placed with pressure P_1, Volume V_1 and temperature T_1, it has undergone thermodynamic changes the temperature is remaining constant, it is– **Isothermal process**
- The respective examples of extensive and intensive properties are– **Entropy, Temperature**
- A thermally isolated, gaseous system can exchange energy with the surroundings. The mode of energy may be– **Work**
- If 'r' is the work done on the system and 's' is heat evolved by the system then– **$\Delta E = r - s$**
- A system absorbs 10 kJ of heat and does 4 kJ of work. The internal energy of the system– **Increases by 6 kJ**
- In thermodynamics a process is called reversible– **The surroundings are always in equilibrium with the system**
- An ideal gas is compressed adiabatically and reversibly, the final temperature– **Higher than the initial temperature**
- The ..... can be zero for isothermal reversible expansion– **ΔE, ΔH, ΔT**
- Two atoms of hydrogen combine to form a molecule of hydrogen gas the energy of the H_2 molecule is– **Lower than that of separate atoms**
- Set of intensive properties is– **Viscosity, refractive index, specific heat**
- For stretched rubber, Entropy– **Decreases**
- The least random state of H_2O is– **Ice**
- ΔS for the reaction : $MgCO_3(s) \rightarrow MgO(s) + CO_2(g)$– **+ve**
- The sole criterion for the spontaneity of a process is– **Tendency to acquire maximum stability**
- ΔS° will be highest for the reaction– **$CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$**

Search on TG: @apna_pdf

@apna_pdf

- In an irreversible process, the value of $\Delta S_{system} + \Delta S_{surr}$ is– **+ve**
- The ..... pairs of a chemical reaction is certain to result in a spontaneous reaction– **Exothermic and increasing disorder**
- For a reaction to occur spontaneously– **$(\Delta H - T\Delta S)$ must be negative**
- In a reaction, all reactant and products are liquid, then– **$\Delta H = \Delta E$**
- The correct option for free expansion of an ideal gas under adiabatic condition is– **$q = 0, \Delta T = O$ and $w = 0$**
- System in which there is no exchange of matter, work or energy from surroundings is– **Isolated**
- When the system does not exchange heat with the surroundings, the process is– **Adiabatic**
- $\Delta U = q + w$, is mathematical expression for– **First law of thermodynamics**
- If w is the amount of work done by the system and q is the amount of heat supplied to the system. The type of the system is– **Closed system**
- A process is called reversible when– **Surrounding is always in equilibrium with system**
- In an adiabatic expansion of ideal gas is– **$w = \Delta U$**
- For the reaction of one mole of zinc dust with one mole of sulphuric acid in a bomb calorimeter, ΔU and w correspond to– **$\Delta U < 0, w = 0$**
- Hess's law is applicable for the determination of heat of– **Transition, Formation, Reaction**
- In general, for exothermic reactions to be spontaneous– **Temperature should be low**
- In endothermic reactions– **Reactants have less energy than products**
- The total change (ΔS_{total}) for the system and surrounding of a spontaneous process is given by– **$\Delta S_{total} = \Delta S_{system} + \Delta S_{surr} > 0$**
- The signs of ΔH and ΔS when NaOH is dissolved in water, will be– **– +**
- For a reaction to be spontaneous at any temperature, the conditions are– **$\Delta H = -ve, \Delta S = +ve$**
- At absolute zero, the entropy of a pure crystal is zero. This is– **Third law of thermodynamics**
- The relationship between ΔG^0 and equilibrium constant K_p is– **$K_p = e^{-\Delta G^\circ/RT}$**
- The state of a gas can be described by quoting the relationship between– **Pressure, volume, temperature, amount**
- The volume of gas is reduced to half from its original volume. The specific heat will– **Remain constant**
- The enthalpies of elements in their standard states are taken as zero. The enthalpy of formation of a compound– **May be positive or negative**
- Enthalpy of sublimation of a substance is equal to– **Enthalpy of fusion + enthalpy of vapourisation**
- The set of parameters that represents path function, is– **q, w**

EXAMSPY

EXAM POINT

Thermodynamics terms and application measurement of ΔU and ΔH calorimetry.

Solubility of a gas in a liquid increases with– **increase of P and decrease of T**	**Karnataka CET-17.06.2022, Shift-II**
For spontaneity of a cell is – **$\Delta G = -ve$**	**Karnataka CET-17.06.2022, Shift-II**
The processes is associated with decrease in entropy– **Crystallization of a salt from its saturated solution**	**MPPET - 2012**
At constant temperature and pressure, if $\Delta G < 0$ the process is called– **spontaneous**	**(AP-EAMCET-1992)**
The reactions does the heat change represent the heat of formation of water is– $H_2 + \frac{1}{2}O_2 \rightarrow H_2O;\ \Delta H = -58$ kcal	**(AP-EAMCET-1991)**
The reaction proceeds with evolution of heat is called– **exothermic reaction**	**(AP-EAMCET-1993)**
In the complete combustion of butanol $C_4H_9OH(l)$, if ΔH is enthalpy of combustion at constant pressure and ΔE is the heat of combustion at constant volume, then– **$\Delta H < \Delta E$**	**(AP-EAMCET-1997)**

Search on TG: @apna_pdf

@apna_pdf

The endothermic reaction is– $N_2(g) + O_2(g) + 180.8\ kJ \rightarrow 2NO(g)$	**AP-EAMCET-2004**
$CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$, $\Delta H = 110$ kJ The pressure of CO_2– **Increases if T is raised**	**MPPET-2013**
For the formation of $NH_3(g)$ from its constituent elements, the favourable conditions for its formation are– **High pressure and low temperature**	**TS-EAMCET (Engg.), 07.08.2021 Shift-II**
The substances has highest value of standard molar enthalpy of formation at 298 K is – **NaF(s)**	**JEE Main-2019**
If, $\Delta H > 0$ and $\Delta S > 0$, the reaction can proceed spontaneously at ..... .– **high temperature**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
The formation of $NH_3(g)$ from its constituent elements at constant temperature and pressure is– **$\Delta H < \Delta U$**	**TS EAMCET 10.08.2021, Shift-II**
The state function is not a – **Work**	**AP EAMCET (Engg.) 17.09.2020, Shift-II MPPET-2008**
Isochores are drawn at .....– **constant volume, pressure vs temperature**	**AP EAMCET (Engg.) 17.09.2020 Shift-I**
The extensive property is an- **Volume**	**AP EAMCET (Engg.) 17.09.2020 Shift-I**
The change in entropy (ΔS) is negative– **Freezing of water**	**AP EAMCET (Engg.) 21.09.2020, Shift-II**
An intensive property is– **boiling point**	**COMEDK-2011**
The all gases, at any given pressure, the graph of volume vs temperature (in celsius) is a straight line. This graph is called– **isobar**	**COMEDK-2014**
The value of ΔG for ice at 8ºC temperature is– **Positive**	**GUJCET-2008**
The relation is:– **$\Delta G = -RT \ln K/Q$**	AIIMS 25 May 2019 (Morning)
The regarding entropy is– **at absolute zero temperature, entropy of a perfect crystalline substance is taken to be zero**	**AIIMS-1994**
The characteristic of a reversible reaction is – **It can be influenced by a catalyst**	**AIIMS-1996**
The increase always for spontaneous process is – **$\Delta S - \frac{\Delta H}{T}$**	**AIIMS-26 May, 2018 (M)**
The extensive properties is an – **V & E**	**AIIMS-26 May, 2018 (M)**
The reaction ΔH is not equal to ΔU an– $C_2H_4(g) + H_2(g) \rightarrow C_2H_6(g)$	**AIIMS-2016**
ΔS_{surr} for an exothermic reaction is– **always positive**	**AIIMS-2007**
For a spontaneous process, it means that:– **Total entropy change is always positive**	**AIIMS-2006**
For a phase change, $H_2O(l) \underset{}{\overset{0^\circ C,\ 1bar}{\rightleftharpoons}} H_2O(s)$– **$\Delta G = 0$**	**AIIMS-2006**
In the exothermic reaction, the enthalpy of reaction is always:– **negative**	**AIIMS-2001**
The internal energy of a substance:– **increases with increase in temperature**	**AIIMS-2001**
For a spontaneous process, entropy:– **Increases**	**AIIMS-1998**
Internal energy does not include:– **Energy due to gravitational pull**	**AIIMS-1999**
At a constant volume the specific heat of a gas is 0.075 and its molecular weight is 40. The gas is :– **Monoatomic**	**AIIMS-1998**
The enthalpy change of a reaction does not depend on:– **different intermediate reactions.**	**AIIMS-1997**

Search on TG: @apna_pdf

@apna_pdf

A spontaneous process is one in the system suffers :– **a lowering of free energy**	**VITEEE- 2008**
Condition for spontaneity in an isothermal process is– **$\Delta A + W < 0$**	**VITEEE- 2007**
The reaction, $Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$ is an example of a– **spontaneous process**	**VITEEE- 2006**
The conditions lead to a spontaneous process is – **Both ΔH and $T\Delta S$ are + ve but $T\Delta S > \Delta H$**	**SRMJEEE – 2013**
A chemical reaction cannot occur at all if its– **ΔH and ΔS are (+)ve but $\Delta H > T\Delta S$**	**AP - EAMCET(MEDICAL) - 2009**
Density of carbon monoxide is maximum at– **4 atm and 500 K**	**Karnataka-CET-2014**
A better criterion for ideality of a gas than $\left(\frac{\partial U}{\partial V}\right)_T = 0$ is– $\left(\frac{\partial H}{\partial P}\right)_T = 0$	**AMU-2017**
The isolated system, $\Delta U = 0$, then– **$\Delta S > 0$**	**AMU-2012**
An adiabatic process occurs in– **isolated system**	AMU – 2009
A reaction is spontaneous at high temperatures if– **ΔH and ΔS both are positive**	AMU – 2007
A process is spontaneous at high temperature if– **$\Delta H > 0$ and $\Delta S > 0$**	AMU-2004
Enthalpy of formation of a compound– **can be either positive or negative**	**Assam CEE-2014**
The gaseous reaction $N_2O_4(g) \rightarrow 2NO_2(g)$– **$\Delta H > \Delta U$**	**Assam CEE-2014**
If temperature of a liquid is raised surface tension of the liquid– **decreases**	**Assam CEE-2019**
An equilibrium mixture of ice and water is under constant pressure, where ice melts if heat is supplied. For this process– **Entropy increases**	**Assam CEE-2018**
Unit of entropy is– **$JK^{-1}mol^{-1}$**	**BCECE-2012**
The variation of viscosity coefficient (η) with temperature (T) is– **$\eta = Ae^{E/RT}$**	**BCECE-2014**
Compounds with high heat of formation are less stable because– **Energy rich state leads to instability**	**BITSAT 2006**
A spontaneous reaction is impossible if– **ΔH is positive and ΔS is negative**	**BITSAT 2015**
The units of energy, represents maximum amount of energy is– **Calorie**	**CG PET -2008**
The adiabatic process is an – $q = 0$	**CG PET -2006**
In a reversible isothermal process, the change in internal energy is– **zero**	**CG PET- 2010**
At the equilibrium position in the process of adsorption :– **$\Delta H = T\Delta S$**	**HP CET-2018**
The process with negative entropy change is– **Synthesis of ammonia from N_2 and H_2**	**JEE Main-2019, Shift-II**
Heat required to raise the temperature of 1 mole of a substance by 1^o is called– **molar heat capacity**	**AIEEE-2002**
During spontaneous discharge of an electrochemical cell, Gibb's free energy will– **decrease**	**J & K CET-(2012)**
The thermochemical property is always takes up negative values an– **Enthalpy of combustion**	**J & K CET-(2016)**
The enthalpy change accompanying a reaction is called– **reaction enthalpy**	**J & K CET-(2014)**
The spontaneity of a reaction if $\triangle H$ and $\triangle S$ both are negative – **Low temperature**	**J & K CET-(2018)**
The intensive property of a system is an – **Temperature**	**J & K CET-(2019)**
PV value decreases with increases in P at constant temperature when– **attractive forces between molecules are predominant**	**J & K CET-(2015)**
The pairs, both variables as intensive variable is– **P, T**	**J & K CET-(2015)**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

The process to occur under adiabatic condition is– **$\Delta q = 0$**	**J & K CET-(2015)**
In thermodynamics, a quantity whose value simply depends upon the initial and final states of the system is called– **a state function**	**J & K CET-(2013)**
If ΔH and ΔS are positive for a reaction, the reaction will be spontaneous only when– **$T\Delta S > \Delta H$**	**J & K CET-(2013)**
The pairs does not represent example for intensive property is – **Heat capacity and enthalpy**	**J & K CET-(2011)**
All naturally occurring process proceed spontaneously in a direction, leads to– **decrease of free energy**	**J & K CET-(2013, 2007)**
The free energy change (ΔG) is negative. The reaction is– **a spontaneous reaction**	**J & K CET-(2006)**
ΔG for a spontaneous reaction is– **negative**	**J & K CET-(2005)**
The endothermic reaction is not an– **combustion of propane**	**J & K CET-(2005)**
A process the system does not exchange heat with the surroundings is known as– **adiabatic**	**JIPMER-2013 J & K CET-(2005)**
In a reversible process, $\Delta S_{sys} + \Delta_{Surr}$ is– **= 0**	**J & K CET-(2004)**
A tightly closed dessicator in action is an example of– **closed system**	**J & K CET-(2002)**
In the reaction milk $\rightarrow$ cheese, ΔS is– **negative**	**J & K CET-(2001)**
The state function is not an– **$P\Delta V$**	**J & K CET-(1997)**
In an isothermal expansion of an ideal gas:– **$\triangle E = 0$**	**JCECE - 2003**
Human body is an example of:– **open system**	**JCECE - 2004**
The reaction to be spontaneous at all temperatures– **ΔG and ΔH should be negative**	**JCECE - 2009**
The chemical reaction is certain to result in a spontaneous reaction is –**Exothermic**	**JCECE - 2012, CG PET - 2007 JIPMER-2007, NEET-2005**
The value of compression factor, Z for critical constants is– **$\frac{3}{8}$**	**JCECE - 2014**
The enthalpy change for a reaction does not depend upon the– **nature of intermediate reaction steps**	**JCECE - 2015 AIEEE-2003**
A reaction occurs spontaneously if– **$T\Delta S > \Delta H$ and both ΔH and ΔS are + ve**	**JIPMER-2007 NEET-2005**
In an isothermal process– **$\Delta H = W$**	**JIPMER-2005**
The internal energy of a substance– **Increase with increase in temperature**	**JIPMER-2005**
The enthalpies of all elements in their standard states are– **Zero**	**JIPMER-2004**
The Conversion of oxygen into ozone is non-spontaneous at– **all temperature**	**JIPMER-2018 Karnataka-CET-2014**
The reaction in $\Delta H > \Delta U$ is– **$CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$**	**Karnataka-CET-2019**
For an ideal binary liquid mixture– **$\Delta S_{(mix)} > 0$; $\Delta G_{(mix)} < 0$**	**Karnataka-CET-2014**
The value of entropy of solar system is– **increasing**	**Karnataka-CET-2013**
For the reaction, $A(g) + B(g) \rightleftharpoons C(g) + D(g); \Delta H = QkJ$ The equilibrium constant cannot be disturbed by– **increasing of pressure**	**Karnataka-CET-2021**
The relation between ΔH and ΔU is– **$\Delta H = \Delta U + \Delta nRT$**	**Karnataka-CET-2007**
The Entropy of universe is– **continuously increasing**	**Karnataka-CET-2007**
The enthalpy of a monoatomic gas at T Kelvin is:– **$\frac{5}{2}RT$**	**Kerala-CEE-2004**
Thermal decomposition of ammonium dichromate gives– **N_2, H_2O and Cr_2O_3**	**Kerala-CEE-2016**

Search on TG: @apna_pdf

@apna_pdf

A gas will approach ideal behavior at– **High temperature and low pressure**	**Kerala-CEE-2017**
The Electrophile involved in the Sulphonation of benzene is :– **SO_3**	**Manipal-2019**
For a process to be spontaneous:– **ΔG must be –ve**	**Manipal-2018**
C_p/C_v for noble gases is :– **1.66**	**Manipal-2017**
The adsorption of krypton on activated charcoal at low temperature:– **$\Delta H < 0$ and $\Delta S < 0$**	**Manipal-2016**
Mathematical equation of first law of thermodynamics for isochoric process is– **$\Delta U = q_v$**	**MHT CET-2016**
The relation between solubility of a gas in liquid at constant temperature and external pressure is stated by law is an – **Henry's law**	**MHT CET-2016**
The equation that represents general Van't Hoff equation is– **$\pi = \frac{n}{V}RT$**	**MHT CET-2016**
The feature of adiabatic expansion is an – **$\Delta T = 0$**	**MHT CET-2015**
According to Hess's law, the heat of reaction depends upon– **initial and final conditions of reactants**	**MHT CET-2011**
The equation is– **$H_2 – H_1 – E_2 + E_1 = n_2RT – n_1RT$**	**MHT CET-2010**
Kirchhoff's equation is– **$\Delta C_p = \frac{\Delta H_2 - \Delta H_1}{T_2 - T_1}$**	**MHT CET-2009**
In ..... process, work is done at the expense of internal energy.– **Adiabatic**	**MHT CET-2009**
Hess's law is based on– **Law of conservation of energy**	**MHT CET-2007**
The path function is an – **Work**	**MHT CET-2007**
For a sample of perfect gas when its pressure is changed isothermally from p_i to p_f, the entropy change is given by– **$\Delta S = nR \ln\left(\frac{P_i}{P_f}\right)$**	**NEET-II 2016**
The irreversible expansion of an ideal gas under isothermal condition is– **$\Delta U = 0$, $\Delta S_{total} > 0$**	**NEET-2021**
The reaction $2Cl_{(g)} \rightarrow Cl_{2(g)}$, is– **$\Delta_r H < 0$ and $\Delta_r S < 0$**	**NEET-2020**
In a closed insulated container a liquid is stirred with a paddle to increase the temperature is – **$\Delta E = W \neq 0$, $q = 0$**	**NEET-2008, UP CPMT-2006**
The occurrence of reaction is impossible if– **ΔH is +ve, ΔS is –ve**	**UP CPMT-2011 J & K CET-(2003)**
The isothermal expansion of ideal gas is – **enthalpy remains unchanged**	**UP CPMT-2007 NEET-1994, 1991**
The endothermic reaction is – **ΔH is positive**	**UP CPMT-2003**
The relation of ΔH and ΔE is represented as– **$\Delta H = \Delta E + \Delta nRT$**	**UP CPMT-2002**
The law states entropy of all pure crystalline solids is zero at absolute zero – **Third law of thermodynamics**	**UP CPMT-2001**
In an isochoric process, ΔH for a system is equal to:– **ΔE**	**UPTU/UPSEE-2006**
For a spontaneous process, is- **$(\Delta G_{system})_{T,p} < 0$**	**WB-JEE-2014**
The condition for a reaction to occur spontaneously is– **($\Delta H – T\Delta S$) must be negative**	**WB-JEE-2016**
At constant pressure, the heat of formation of a compound is not dependent on temperature, when– **$\Delta C_p = 0$**	**WB-JEE-2019**
For spontaneous polymerization is not an – **ΔS is negative**	**WB-JEE-2020**
Work done by an ideal gas at a constant volume is ..... .– **0**	**AP EAMCET (Engg.) 21.09.2020, Shift-I WB-JEE-2013**

JEAM SPY

Search on TG: @apna_pdf

@apna_pdf

The represents the first law of thermodynamics is – **$\Delta U = q + W$**	**CG PET-2012**
Based on the first law of thermodynamics is - **For a cyclic process q = – w**	**Karnataka-CET, 2011, 2010**
According to the first law of thermodynamics quantities is represents the change in a state function is – **$q_{rev} + W_{rev}$**	**JIPMER-2011 Kerala-CEE-2010**
The first law of thermodynamic is expressed as:– **$q = \Delta E - W$**	**Kerala-CEE-2006**
The ideal gas behaviour of a gas can be expressed as :– **$Z = \frac{PV}{nRT}$**	**Manipal-2018**
"The mass and energy both are conserved in an isolated system is" – **modified first law of thermodynamics**	**MHT CET-03.05.2019, Shift-I**
Work done by 1 mole of an ideal gas for its adiabatic reversible change when temperature attains T_2 from T_1 is'– **$C_V (T_2 - T_1)$**	**Tripura JEE-2022**
The changes entropy decreases is a –**Crystallization of sucrose from solution**	**UPTU/UPSEE-2018**
Pressure-volume (PV) work done by an ideal gaseous system at constant volume is (where E is internal energy of the system)– **zero**	**WB-JEE-2013**

Work done and enthalpy change ΔH of a reaction.

The enthalpy change of a reaction does not depend on– **Different intermediate states**	**SCRA-2015**
The compounds has the highest hydration energy is – **$BeSO_4$**	**TS-EAMCET 09.08.2021, Shift-I**
The increasing order of enthalpy of vaporisation is – **PH_3, AsH_3, NH_3**	**AIIMS-2004**
ΔH_f^o (298K) of methanol is given by the chemical equation:– **$C(graphite) + \frac{1}{2}O_2(g) + 2H_2(g) \rightarrow CH_3OH(l)$**	**AIIMS-2005**
Heat of formation, ΔH_f° of an explosive compound like NCl_3 is– **Positive**	**VITEEE- 2011**
Enthalpy of a compound is equal to its– **Heat of formation**	**VITEEE- 2010**
Enthalpy of neutralization of all strong acids and bases has same value, because– **Neutralization leads to the formation of a salt and water**	**Assam CEE-2014**
The neutralization reactions, the heat of neutralization is highest an – **HCl and NaOH**	**Assam CEE-2014 SRMJEEE-2008**
The heat of neutralisation of any strong acid and a strong base is nearly equal to :– **–57.3 kJ**	**BCECE-2005**
$\Delta U°$ of combustion of methane is –X k J mol^{-1}. The value of $\Delta H°$ is– **$< \Delta U°$**	**BCECE-2012**
The reaction $CO_2(g) + H_2(g) \rightarrow CO(g) + H_2O(g)$ $\Delta H = 40$ kJ; ΔH represents is : **– Heat of reaction**	**BITSAT 2005**
At 25^0C and 1 bar has a non-zero ΔH_f^0 is – **$O_3(g)$**	**BITSAT 2009**
The heats of neutralisation of CH_3COOH, HCOOH, HCN and H_2S are – 13.2, – 13.4, –2.9 and –3.8 k cal per equivalent respectively. Arrange the acids in increasing order of acidic strength.– **$HCOOH > CH_3COOH > H_2S > HCN$**	**BITSAT 2014**
The reactions, standard entropy change (ΔS^0) is positive and standard Gibb's energy change (ΔG^0) decreases sharply with increasing temperature is – **C(graphit**	**BITSAT 2012**
Energy of activation of an endothermic reaction is– **positive**	**CG PET- 2011**
Heat of neutralization of HCl and NaOH is– **–13.7 kcal**	**CG PET- 2012**

Search on TG: @apna_pdf

@apna_pdf

For the equilibrium reaction, $2SO_2(g)+O_2(g) \rightleftharpoons 2SO_3(g)+\Delta H$ the increase in temperature– **favours the decomposition of SO_3**	**CG PET- 2012**
The role of a catalyst in a catalysed reaction is – **Lowers the activation energy**	**CG PET -2005**
The hydrogen halides has the least bond dissociation enthalpy is– **HI**	**J & K CET-(2016)**
The order of lattice energy values is alkali halides is LiCl, KI, KCl and NaCl–**LiCl**	**J & K CET-(2017)**
The heat of neutralisation will be highest in– **HC*l* +NaOH**	**J & K CET-(2019)**
The standard enthalpy of formation of all elements in their standard state is– **zero**	**J & K CET-(2019)**
Changes in a system from an initial state to the final state were made by a different manner that remains **ΔH** remains same but q changes because– **ΔH is a state function and q is a path function**	**J & K CET-(2010)**
The factor does not affect the heat of reaction is– **whether the reaction is carried out directly or indirectly**	**J & K CET-(2002)**
The gaseous reaction involving complete combustion of isobutane (assuming all products and reactants are in gaseous state). The relation between ΔH and ΔE will be– **ΔH > ΔE**	**JCECE - 2016**
The combustion gives maximum energy is – **Butane**	**MHT CET-2012**
Hess's law is used to calculate:– **enthalpy of reaction**	**UPTU/UPSEE-2005**
Enthalpy of solution of NaOH (solid) in water is – 41.6 kJ mol^{-1}. When NaOH is dissolved in water, the temperature of water:– **Increases**	**UPTU/UPSEE-2004**
The heat evolved in neutralisation of HF is highest is– **Due to high hydration energy of F^- ion**	**UPTU/UPSEE-2018**

Enthalpies of different types of reaction

$N_2(g)+3H_2(g) \rightleftharpoons 2NH_3(g)$ Then ΔH is equal to : **ΔU – 2RT**	**CG PET-22.05.2022**
The reactions defines ΔH_f° is – $\frac{1}{2}H_2(g)+\frac{1}{2}F_2(g) \rightarrow HF(g)$	**JCECE - 2014**

Spontaneity, entropy, Gibbs Energy change and equilibrium.

The spontaneity of chemical reaction there should be:– **increase in entropy and decrease in free energy**	**MPPET - 2012**
For an adiabatic change in a system – **q = 0**	**COMEDK-2015**
A piece of ice kept at room temperature melts of its own. This reaction is governed by law is – **Second law of Thermodynamics**	**GUJCET-2008**
The intensive property is not an – **Entropy**	**TS EAMCET 05.08.2021, Shift-I**
The change of Gibbs energy for a system (ΔG_{system}) at constant temperature and pressure– **If ΔG_{system} =0, the system has attained equilibrium**	**CG PET -2007**
Entropy of a perfectly crystalline solid at 0 K is– **zero**	**J & K CET-(2012)**
Entropy change in a process where 1 litre of liquid. He is poured into ice cold water is– **finite and positive**	**J & K CET-(2012)**
The water is cooled to its entropy– **decreases**	**J & K CET-(2010)**
The units of entropy is – **cal.K^{-1}**	**J & K CET-(2006)**
The entropy of crystalline substances at absolute zero going by the third law of thermodynamics should be taken as– **Zero**	**J & K CET-(2005)**
If one mole of ammonia and one mole of hydrogen chloride are mixed in a closed container to form ammonium chloride gas, then– **ΔH < ΔU**	**KARNATAKA-CET, 2008**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

For a process, entropy change of a system is expressed as– $-\frac{q_{rev}}{T}$	**MHT CET-02.05.2019, SHIFT-III WB-JEE-2013**
The second law of thermodynamics says that in a cyclic process– **heat cannot be completely converted into work**	**WB-JEE-2009**
The arrangements shows the bonds H–H, C–C and Si–Si in order of increasing bond energy is – **Si–Si < C–C < H–H**	**SCRA 2012**
The order for the bond energies of halogen molecules is– **$Cl_2 > Br_2 > I_2$**	**AP EAMCET (Engg.) 2001**
The decreasing order of bond dissociation energies of C–C, C–H and H–H bonds in– **H – H > – C – H > – C – C –**	**AP EAMCET (Engg.) -2007**
The bond energies of F_2, Cl_2, Br_2 and I_2 are 155, 244, 193 and 151kJ/mol. The weakest bond will be in– **I_2**	AMU 2002
Internal energy is sum of– **all types of energy of the system**	**BCECE-2008**
The C–C bond dissociation energy in kcal/mol is– **81**	**BCECE-2009**
The energy that opposes dissolution of a solvent is– **lattice energy**	**BITSAT 2006**
The bond energy is the energy required to– **break one mole of similar bonds**	**MHT CET-2007**
An endothermic reaction is found to have +ve entropy change. The reaction will be– **possible at high temperature**	**COMEDK-2015**
For a reaction to be spontaneous at all temperatures,– **ΔG = -ve, ΔH = -ve and ΔS = +ve**	**AIIMS-2008**
The standard Gibb's free energy change, $\Delta G°$ is related to equilibrium constant, K_p as– **$K_p = e^{-\Delta G°/RT}$**	**VITEEE- 2010**
For a cell reaction to be spontaneous, the standard free energy change of the reaction must be– **negative**	**CGPET-2007 VITEEE- 2006**
For a reaction at equilibrium,– **$\Delta G = 0$ but not $\Delta G°$**	**SRMJEEE – 2008**
In the process of ice melting at –15°C at atmospheric pressure,– **$\Delta G > 0$**	AMU – 2008
For a process to occur spontaneously– **($\Delta H - T\Delta S$) must be negative**	**Assam CEE-2014**
For a system in equilibrium– **$\Delta G = 0$**	**BCECE-2009**
For a chemical reaction, ΔG is always less than zero ($\Delta G < 0$) if– **ΔH is negative and $T\Delta S$ is positive**	**CG PET -2019**
Cell reaction is spontaneous when– **ΔG° is negative**	**CG PET -2007**
The free energy change in a reaction and the corresponding equilibrium constant K_c is– **$-\Delta G° = RT\ 1nK_c$**	**AIEEE-2003**
A process will be spontaneous at all temperature if– **$\Delta H < 0$ and $\Delta S > 0$**	**JEE Main-2019, Shift-I**
The Gibb's Helmholtz equation is – $\Delta S = \frac{1}{T}[\Delta H - \Delta G]$	**JCECE - 2003**
In equilibrium state the value of ΔG is– **zero**	**Karnataka-CET-2007**
The standard Gibbs free energy of reaction (ΔG) is known is – **Equilibrium constant**	**Kerala-CEE-2018**
The criterion for a spontaneous process is– **$\Delta G < 0$**	**MHT CET-2016**
$PbO_2 \rightarrow PbO$, $\Delta G_{298} < 0$ $SnO_2 \rightarrow SnO$, $\Delta G_{298} > 0$ Most probable oxidation state of Pb and Sn will be– **Pb^{2+}, Sn^{4+}**	**NEET-2001**
A reaction having equal energies of activation for forward and reverse reactions has– **$\Delta H = 0$**	**NEET, 2013**
The value of ΔG and ΔG^0 for the reaction, $A + B \rightleftharpoons C + D$ at 27°C for the $K = 10^2$ is – **ΔG = –11.48 kj mol^{-1}; $\Delta G^0 = 0$**	**UPTU/UPSEE-2018**

Search on TG: @apna_pdf

@apna_pdf

4. States of Matter

The Gas Laws

- At temperature, the volume of a gas would become zero– **273.15°C**
- In order to increase the volume of a gas by 10%, the pressure of the gas should be– **decreased by 10%**
- Graph between p and V at constant temperature is– **Straight, Curved increasing, Straight line with slope**

Ideal Gas Equation

- The expression is true regarding gas laws? (W = weight, M = molar mass)– $\frac{T_1}{T_2} = \frac{M_1 W_2}{M_2 W_1}$
- A cylinder is filled with a gaseous mixture containing equal masses of CO and N_2. The partial pressure ratio is– $P_{N_2} = P_{CO}$
- For n moles of ideal gas, the equation of state may be written as– **P/T = nR/V**
- The numerical value of universal gas constant (R) depends upon– **The units of measurement**
- If p, V, M, T and R are the symbol of pressure, volume, molecular weight, temperature and gas constant respectively, what is the equation of density of ideal gas?– $\frac{pM}{RT}$

Kinetic Energy and Molecular Speeds & Kinetic Molecular Theory of Gases

- The ratio of kinetic energies of 3 g of hydrogen and 4 g of oxygen at T(K)– **12 : 1**
- The root mean square velocity of ideal gas at constant pressure varies with density (d) as– $1/\sqrt{d}$
- Average K.E. of CO_2 at 27°C is E. The average K.E. of N_2 at the same temperature will be– **E**
- The kinetic energy of one mole of any gas depend upon– **Absolute temperature of gas**
- The ratio of root mean square speed, average speed and most probable speed is– **$3\pi : 8 : 2\pi$**

Deviation From Ideal Gas Behaviour and Liquefaction of Gases

- The critical temperatures of O_2, N_2, H_2 and CO_2 are 154.3 K, 126 K, 33.2 and 304 K. The extent of adsorption on tungsten may be highest in case of– **CO_2**
- Maximum deviation from ideal gas is expected from– **$NH_3(g)$**
- The compressibility factor (Z) of one mole of a van der waal's gas of negligible 'a' value is– $1 + \frac{bP}{RT}$
- The gases can be liquefied easily is– **Chlorine**
- The compressibility factor for an ideal gas is– **= 1**
- The temperature at real gases obey the ideal gas laws over a wide range of pressure is called– **Boyle temperature**
- At relatively, high pressure, van der waal's equation reduces to– **PV = RT + Pb**
- In vander waal's equation of state of the gas, the constant b' is a measure of– **Volume occupied by the molecules**
- The real gas most closely approaches the behaviour of an ideal gas at– **0.5 atm and 500 K**
- A gas can be liquefied– **Below its critical temperatue**
- In van der Waal's equation of state for a non-ideal gas, the term that accounts for intermolecular force is– $\left(\frac{a}{V^2}\right)$
- The van der Waal's constants "a" for gases P, Q, R and S are 4.17, 3.59, 6.71 and 3.8 atm L^2 mol^{-2}. Therefore, the ascending order of their liquefaction is– **Q < S < P < R**

Liquid State

- The surface tension of the liquid is maximum in– **H_2O**
- The S.I. unit of surface tension is– **Newton/metre**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

- A water drop is spherical in shape due to _____ **Surface tension**
- Viscosity of liquid _____ with rise in temperature.– **Decreases**
- The temperature at vapour pressure of liquid is equal to the external pressure is called– **Boiling temperature**
- With increase in altitude, atmospheric pressure– **Decreases**
- The properties of liquids is a measure of resistance to flow– **Viscosity**
- Dipole-induced dipole interactions are present in pairs is – **HC*l* and He atoms**
- The rms velocity of hydrogen in $\sqrt{7}$ times the rms velocity of nitrogen. If T is the temperature of the gas, then– $\mathbf{T_{(H_2)} < T_{(N_2)}}$
- The vander Waals constant 'a' for the gases CH_4, N_2, NH_3 and O_2 are 2.25, 1.39, 4.17 and 1.3 L^2 atm. mol^{-2} respectively. The gas which shows highest critical temperature is– $\mathbf{NH_3}$
- A person living in Shimla observed that cooking food without using pressure cooker takes more time. The reason for this observation is that at high altitude– **Pressure decreases**
- The property of water can be used to explain the spherical shape of rain droplets is– **Surface tension**
- The interaction energy of London force is inversely proportional to sixth power of the distance between two interacting particles but their magnitude depends upon– **Polarisability**
- The is SI unit of viscosity coefficient (η)– $\mathbf{Nsm^{-2}}$
- Increase in kinetic energy can overcome intermolecular forces of attraction. The viscosity of liquid be affected by the increase in temperature is– **Decrease**
- The he surface tension of a liquid vary with increase in temperature– **Decreases**
- A mixture of N_2 and Ar gases in a cylinder contains 7 g of N_2 and 8 g of Ar. If the total pressure of the mixture of the gases in the cylinder is 27 bar, the partial pressure of N_2 is– **15 bare**
- The minimum pressure required to compress 600 dm^3 of a gas at 1 bar to 150 dm^2 at 40°C is– **4.0 bar**
- "One gram molecules of a gas at N.T.P occupies 22.4 litres"– **Avogadro's hypothesis**
- The molecular velocities of two gases at the same temperature are u_1 and u_2 and their molar masses are m_1 and m_2 respectively. The expression is– $\mathbf{m_1u_1^2 = m_2u_2^2}$
- At constant volume for a fixed number of a moles of a gas, the pressure of the gas increases with the rise in temperature due to– **Increase in average molecular speed**
- The root mean square velocity of an ideal gas at constant pressure varies with density as– $\frac{\mathbf{1}}{\sqrt{\mathbf{d}}}$
- Pressure exerted by a perfect gas is equal to– **Two thirds of mean kinetic energy per unit volume**
- A gas such as carbon monoxide would be most likely to obey the ideal gas law of– **High temperatures and low pressures**
- If a gas expands at constant temperature, it indicates that– **Kinetic energy of molecules remains the same**
- Temperature at which gas behave ideally over a wide range of pressure is called as– **Boyle's temperature**
- Van der Waal's constant 'a' and 'b' are related with _____ respectively– **Attractive force and volume of molecules**
- At high temperature and low pressure van der Waal's equation can be expressed as– **PV = RT**
- Van der Waal's constant 'a' has the dimension has the dimension of– $\mathbf{atm\ L^2mol^{-2}}$
- Relation for 1 mole real gases– $\left(\mathbf{P+\frac{a}{V^2}}\right)=\mathbf{\frac{(R+T)}{(V-b)}}$
- For a real gas, Z shows– **PV≠nRT, for real gas**
- The compressibility factor 'Z' for the gas is given by– $\mathbf{Z=\frac{PV_{obs}}{nRT}}$
- The ..... gas always shows positive deviation from ideal gas behaviour– $\mathbf{N_2}$
- For non-zero value of force of attraction between gas molecules, gas equation will be– $\mathbf{PV = nRT - \frac{n^2a}{V}}$
- When there can be more deviation in the behaviour of a gas from the ideal gas equation PV = nRT– **At low temperature and high pressure**
- The beans are cooked earlier in pressure cooker because– **Boiling point increases with increasing pressure**
- Van der Waal's real gas acts as an ideal gas, at which conditions– **High temperature, low pressure**
- The Critical temperature, Boyle's temperature and Inversion temperature respectively are– $\mathbf{\frac{8a}{27Rb}, \frac{a}{Rb}, \frac{2a}{Rb}}$
- Boyle's temperature and inversion temperature are related as– $\mathbf{T_i = 2T_b}$
- The critical temperature of a gas is related to van der Waal's constants as– $\mathbf{T_c = \frac{8a}{27bR}}$
- Boyle's temperature T_b is equal to– $\frac{\mathbf{a}}{\mathbf{bR}}$
- The point at densities of a substance in gaseous as well as in liquid state are same called– **Critical point**
- The surface tension of the ..... liquid is maximum– $\mathbf{H_2O}$
- An ideal gas, obeying kinetic theory of gases can not be liquefied, because– **Forces acting between in molecules are negligible**

Search on TG: @apna_pdf

@apna_pdf

- If saturated vapours are compressed slowly at constant temperature to half the initial volume, the vapour pressure will– **Remains unchanged**
- The types of attractive forces between a polar molecule and a non-polar molecule are– **Dipole-induced dipole forces**
- Boiling point of hydrogen fluoride is highest amongst HF, HC*l*, HBr and HI. The type of intermolecular forces present in hydrogen fluoride is– **H–F has highest dipole moment hence has dipole-dipole, London forces and hydrogen bonding**
- The effect on chemical properties and physical properties of water when temperature is changed.– **Chemical properties of water remain same but the physical state changes with change in temperature**
- Representing P, V and T as pressure, volume and temperature. The correct representation of Boyle's law is– $V \propto \frac{1}{p}$ **(T constant)**
- The effect on the pressure of a gas if its temperature is increased at constant volume is– **The pressure of the gas increases**
- Absolute zero can be defined as the temperature at which– **Volume becomes zero**
- The value of the gas constant 'R' is close to– **0.082 litre-atmosphere K^{-1} mol^{-1}**
- Value of gas constant R in the ideal gas equation, PV = nRT depends upon– **Units in P, V and T are measured**
- For an ideal gas, number of moles per litre in terms of its pressure, temperature and gas constant is– **P/RT**
- Ideal gas equation is also called equation of states because – **It is a relation between four variables and describes the state of any gas**
- At any particular time, different particles in the gas– **Have different speeds and hence different kinetic energies**
- According to kinetic theory of gases, the collisions between molecules of a gas occur in a – **Straight line**
- A gas that follows Boyle's law, Charles' law and Avogadro's law is called an ideal gas. Under what conditions a real gas behaves as ideal gas– **Under low pressure and high temperature**
- In van der Waals' equation for a non-ideal gas, the term that accounts for intermolecular force is– $\left(p + \frac{a}{v^2}\right)$
- The expressions that represents the value and unit of van der Waals constant a– $a = \frac{PV^2}{n^2}$, **atm L^2 mol^{-2}**
- Van der Waals constant b in corrected equation for real gases represents– **Measure of effective size of gas molecules**
- In the corrections made to ideal gas equation for real gases, the reductions in pressure due to forces of attractions between the molecules is directly proportional to– n^2/V^2
- A real gas obeying van der Waals equation will resemble ideal gas, if the– **Constants a and b both are small**
- Under conditions gases generally deviate from ideal behaviour– **At low temperature and high pressure**
- At Boyle's temperature, compressibility factor Z for a real gas is– **1**
- It is observed that H_2 and He gases always show positive deviation from ideal behaviour i.e., Z > 1. This is because– **The weak intermolecular forces of attraction due to is very small and a/V^2 is negligible**
- The most favourable conditions to liquefy a gas are– **Low temperature and high pressure**
- It is easier to liquefy ammonia than oxygen because– **NH_3 has a higher value of van der Waals constant a and higher critical temperature than oxygen**
- Liquids are similar to gases because– **Both diffuse and take the shape of the containers**
- Vapour pressure of a liquid increases with– **Increase in temperature**
- Surface tension does not vary with– **Size of the surface**
- Relation between viscosity and liquid flow is– **Greater the viscosity, more slowly the liquid flows**
- Dipole-dipole forces act between the molecules possessing permanent dipole. Ends of dipoles possess 'partial charges'. The partial charge is– **Less than unit electronic charge**
- As the temperature increases, average kinetic energy of molecules increases. The effect of increase of temperature on pressure provided the volume is constant would be– **Increases**
- The predominant intermolecular forces present in ethyl acetate, a liquid, are– **London dispersion and dipole-dipole**
- The relative strength of interionic/intermolecular forces in decreasing order is– **ion-ion > ion-dipole > dipole-dipole**
- By what factor does the average velocity of a gaseous molecule increase when the temperature (in Kelvin) is doubled– **1.4**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

EXAM POINT	
A given mass of a gas obeys Boyle's law at certain temperature. The graph representation of Boyle's law- **P vs V**	**A-P EAMCET 1995**
The representation of Charles' law– **$V_1T_2 = V_2T_1$**	**A-P EAMCET 1995**
n moles of an ideal gas at temperature, T (in Kelvin) occupy V L of volume, exerting a pressure of P atmospheres. The concentration (in mol/L) is – **$\frac{P}{RT}$**	**A-P EAMCET 2001**
At 27ºC, a closed vessel contains a mixture of equal weights of helium, (mol. wt. = 4), methane (mol. wt. = 16) and sulphur dioxide (mol. wt. = 64). The pressure exerted by the mixture is 210 mm. The partial pressures of helium, methane and sulphur dioxide are P_1, P_2 and P_3 respectively– **$p_1 > p_2 > p_3$**	**A-P EAMCET 2002**
A and B are ideal gases. The molecular weights of A and B are in the ratio of 1 : 4. The pressure of a gas mixture containing equal weights A and B is p atm. The partial pressure (in atm) of B in the mixture– **$\frac{p}{5}$**	**A-P EAMCET 2005**
A person living in Shimla observed that cooking food without using pressure cooker takes more time. The reason is that at high altitude– **Pressure decreases**	**AP EAPCET 23-08-2021 Shift-I**
The ratio of rates of diffusion of gases X and Y is 1 : 5 and that of Y and Z is 1 : 6. The ratio of rates of diffusion of Z and X is– **30 : 1**	**AP EAMCET (Engg.) -2014**
The value of the gas constant R is close to– **0.082 L atm K^{-1} mol^{-1}**	**COMEDK 2019**
The rate of diffusion of SO_2, CO_2 PCl_3 and SO_3 are in the order– **$CO_2 > SO_2 > SO_3 > PCl_3$**	AIIMS 25 May 2019 (Evening)
A bottle of dry ammonia and a bottle of dry hydrogen chloride connected through a long tube are opened simultaneously at both ends. The white ammonium chloride ring first formed will be– **near the hydrogen chloride bottle.**	**AIIMS-2014**
In P versus V graph, the horizontal line is found in _____exists.– **Equilibrium between gas and liquid**	**AIIMS-2007**
If P is pressure and ρ is density of a gas, then P and ρ are related as– **$P \propto p$**	**AIIMS-2002**
On the top of a mountain, water boils at :– **low temperature**	**AP-EAMCET (Engg.) 2015**
When a perfect gas a 27° is heated at a constant pressure, to a final temperature of 327°C, then the volume of the gas increases to _____ times the original– **2**	**AP- EAPCET- 07-09-2021, Shift-I**
CH_4 diffuses two times faster than a gas X. The number of molecules present in 32 g of gas X is (N is Avogadro number)– **$\frac{N}{2}$**	AP-EAMCET- (Engg.) - 2010
The variable determining the state of a system– **Volume, pressure, and temperature**	AMU–2003
Standard boiling point of a liquid is– **The boiling point at 1 atm pressure**	**Assam CEE-2019**
Slope between PV and P at constant temperature is :– **zero**	**BCECE-2004**
At a constant volume the specific heat of a gas is 0.05 and its molecular weights is 40. The gas is :– **Monoatomic**	**BITSAT 2010**
The predominant intermolecular forces present in ethyl acetate, a liquid, are:– **London dispersion and dipole-dipole**	**[JEE Main 2020, 8 Jan Shift-I]**
The volume of gas A is twice than that of gas B. The compressibility factor of gas A is thrice than that of gas B at same temperature. The pressures of the gases for equal number of moles are– **$2p_A = 3p_B$**	**[JEE Main 2019, 12 Jan Shift-I]**
The intermolecular interaction that is dependent on the inverse cube of distance between the molecules is– **ion-dipole interaction**	**[JEE Main 2015]**
The relative strength of interionic /intermolecular forces in decreasing order is– **ion-ion>ion-dipole>dipole-dipole**	**[JEE Main 2020, 7 Jan Shift-I]**

Search on TG: @apna_pdf

@apna_pdf

The theory proposed by Gay Lussac's was– **When gases combine or reproduced in a chemical reaction they do so in a simple ratio by volume provided all gases are at the same T and P**	[JEE Main 2020, 7 Jan Shift-I]
If rate of diffusion of CH_4 is twice than that of a gas *x*, then its molecular mass is :– **64 g**	**JCECE - 2006**
Avogadro's hypothesis states that:– **Under the same conditions of temperature and pressure, equal volumes of gases contain the same number of molecules**	**JCECE - 2005**
A gas mixture contains O_2 and N_2 in the ratio of 1 : 4 by weight. The ratio of their number of molecules is– **7 : 32**	**JIPMER-2008**
In order to increase the volume of a gas by 10%, the pressure of the gas should be– **decreased by 10%**	**KARNATAKA-CET, 2008**
The ratio of rate of diffusion of SO_2 (M = 64) and oxygen (M = 32) is :– **1 : 1.414**	**Manipal-2019**
In liquid gas equilibrium, the pressure of vapours above the liquid is constant at– **Constant temperature**	**AIPMT-1995**
The beans are cooked earlier in pressure cooker because– **boiling point increase with increasing pressure**	**NEET-2011 BITSAT -2009**
At STP, 0.50 mol H_2 gas and 1.0 mol He gas– **have equal average kinetic energies**	**NEET-1993**
The gas equation is– $\frac{P_1V_1}{P_2V_2}=\frac{T_1}{T_2}$	**NEET-1989**
Pressure remaining the same, the volume of a given mass of an ideal gas increase for every degree centigrade rise in temperature by definite fraction of its volume at– **0°C**	**NEET-1989**
The total energy of an isolated system is- **constant**	**UP CPMT-2014**
Boyle's temperature- $T_B=\frac{a}{bR}$	**UP CPMT-2011**
A mixture of gases having different molecular weights is separated by–**Atmolysis**	**UP CPMT-2010**
The relation for diffusion of gases– $r \propto \frac{1}{\sqrt{d}}$	**UP CPMT-2005**

Ideal Gas Equation

If the pressure and the absolute temperature of a given mass of gas are doubled, the new volume will be …….. of the initial volume– **same**	**A-P EAMCET 1991**
The molecular weight of a gas that diffuses twice as rapidly as a gas with molecular weight 64, is– **16**	**A-P EAMCET 1994**
A contains 16 g of oxygen, 28 g of nitrogen and 8g of CH_4. Total pressure of mixture is 740 mm. The partial pressure of nitrogen in mm?– **370**	**A-P EAMCET 1999**
A gas deviates most from ideal behavior when it is subjected to – **Low temperature & high pressure**	**AP-EAMCET 25-08-2021 Shift - I**
The expression relating changes of entropy for an ideal gas at constant temperature is – $\Delta s = nR\ln\frac{P_1}{P_2}$	**MPPET-2008**
Equal masses of methane and oxygen are introduced into a vessel at 27°C. The fraction of total pressure due to oxygen is – $\frac{1}{3}$	**A-P EAMCET 1995**
The volume of a given mass of a gas is directly proportional to its Kelvin temperature at constant pressure. The above statement is known as ..... .– **Charle's law**	**AP EAMCET (Engg.) 21.09.2020, Shift-II**

Search on TG: @apna_pdf

@apna_pdf

The average kinetic energy of one molecule of an ideal gas at 27°C and 1 atm pressure is– **$6.21 \times 10^{-21} JK^{-1}$ molecule^{-1}**	**AP EAMCET (Engg.)-2009**
The density of an ideal gas can be given by——where P, V, M, T and R respectively denote pressure, volume, molar-mass, temperature and universal gas constant.– **$\frac{PM}{RT}$**	**AP EAPCET 19-08-2021 Shift-I**
The mixture forming an ideal solution – **$n-C_6H_{14} + n-C_7H_{16}$**	**TS-EAMCET (Engg.), 06.08.2021**
The rate of diffusion of SO_2,CO_2,PCl_3 and SO_3 are in order is– **$CO_2 > SO_2 > SO_3 > PCl_3$**	**AIIMS-2013**
Berthelot equation is – **$\left(P+\frac{a}{TV^2}\right)(V-b)=RT$**	**AIIMS-2000**
The transport of matter in the absence of bulk flow is known as:– **diffusion**	**AIIMS-1999**
Van der Waal's equation; $\left[P+\frac{a}{V^2}\right](V-b)=nRT$ is applicable for:– **non- ideal gas**	**AIIMS-1998**
When ideal gas expands in vacuum, the work done by the gas is equal to– **0**	**VITEEE- 2006**
The ratio of rates of diffusion of hydrogen chloride and ammonia gases is– **1:1.46**	AMU – 2010
An ideal gas is undergoing from an initial volume, isothermal and adiabatic expansion from an initial volume, V_i and pressure, P_i to a common final volume of V_f, then– **$P_{adiabatic} < P_{isothermal}$: $V_{adiabatic} < V_{isothermal}$**	**AMU–2006**
Two litres of an ideal gas at a pressure of 10 atm expands isothermally into a m vacuum until its total volume is ten litres During this process– **no work is done; no heat is absorbed**	**Assam CEE-2019**
A gas has a vapour density 11.2. The volume occupied by 1g of the gas at NTP is:– **1 L**	**BCECE-2004**
If the pressure and absolute temperature of 2L of carbon dioxide gas are doubled, the value of the gas would become– **2L**	**BCECE-2011**
The inversion temperature (T_i) for a gas is given by– **2a/Rb**	**BITSAT 2005**
The temperature, at a gas shows maximum ideal behaviour, is known as– **Boyle's temperature**	**CG PET -2009**
For an ideal gas, number of moles per liter in terms of its pressure P, temperature T and gas constant R is– **$\frac{P}{RT}$**	**[AIEEE 2002]**
The gases diffuse at the same rate through a porous plug – **N_2O , CO_2, NO, C_2H_6**	**J & K CET-(2011)**
If the ratio of the rates of diffusion of two gases A and B is 4 : 1. Then the ratio of their densities in the same order is– **1 : 16**	**J & K CET-(2009)**
A, B and C are ideal gases. Their molecular weights are 2, 4 and 28 respectively. The rate of diffusion of these gases follow the order– **A > B > C**	**J & K CET-(2006)**
The rate of diffusion of a gas is proportional to– **$P/\sqrt{d}$**	**J & K CET-(2004)**
Measurement of the dry gas from the volume of moist gas is based on– **Dalton's law of partial pressure**	**J & K CET-(2001)**
At constant temperature, in a given mass of an ideal gas– **the product of pressure and volume always remains constant**	**JCECE - 2011**
For an ideal binary liquid solution with $p_x^0 > p_y^0$ in relation between X_x (mole fraction of X in liquid phase) and Y_x (mole fraction of X in vapour phase) is correct, X_y and Y_y are mole fraction of Y in liquid and vapour phase respectively– **$\frac{X_x}{X_y} < \frac{Y_x}{Y_y}$**	**JIPMER-2015**

Search on TG: @apna_pdf

@apna_pdf

Temperature of a gas is t K. The temperature at volume and pressure, both will reduced to half of the initial values– **t/4**	**JIPMER-2016**
For an ideal gas, compressibility factor is – **1**	**Karnataka-CET-2018**
A gas deviates from ideal behavior at a high pressure because its molecules– **attract one another**	**KARNATAKA-CET, 2008**
When the absolute temperature of ideal gas is doubled and pressure is halved the volume of gas– **will be 4 times the original volume**	**Kerala-CEE-29.08.2021 Karnataka-CET-2021 Kerala-CEE-2005**
Pressure of ideal and real gases at 0 K are– **0 and > 0**	**Kerala-CEE-2017**
4 L-atm is equal to– **96 cal**	**MHT CET-2010**
For an ideal gas, the heat of reaction at constant pressure and constant volume are related as– $q_p = q_v + \Delta nRT$	**MHT CET-2007**
When a deviation more in the behaviour of a gas from the ideal gas equation PV = nRT– **At low temperature and high pressure**	**NEET-1993**
A gas such as carbon monoxide would be most likely to obey the ideal gas law at– **high temperature and low pressure**	**NEET-2013**
If P, V, M, T and R are pressure, volume, molar mass, temperature and gas constant respectively, then for an ideal gas, the density is given by– $\frac{PM}{RT}$	**NEET-1989**
The compressibility factor of an ideal gas is– **1**	**UP CPMT-2003**
For an ideal gas, Joule-Thomson coefficient is– **zero**	**UP CPMT-2001**
Van der Waals' real gas, acts as an ideal gas at the condition of – **High temperature, low pressure**	**UPTU/UPSEE-2015 BCECE-2012 NEET-2002**
Avogadro's law is valid for– **ideal gas**	**WB-JEE-30.04.2022**
Mixing of two different ideal gases under isothermal reversible condition will lead to– **increase of entropy of the system**	**WB-JEE-2013**

Kinetic energy and molecular speeds and kinetic molecular theory of gases

Real gases show ideal behaviour at– **low pressure and high temperature**	**A-P EAMCET 1996**
The compressibility factor (Z) of a gas is < 1 at STP. Therefore– $V_m < 22.4L$	**TS EAMCET 10.08.2021, Shift-II**
A real gas would be most likely to obey the ideal gas laws at ——— **high temperature and low pressure**	**AP EAPCET 25.08.2021, Shift-II**
A low pressure, the van der Waal's equation is reduced to– $Z = \frac{PV_m}{RT} = 1 - \frac{a}{VRT}$	**VITEEE-2019**
In Van der Waals' equation of state of the gas law, the constant 'b' is a measure of– **Volume occupied by the molecules**	**[AIEEE 2004]**
The compressibility factor for a real gas at high pressure is– $1 + \frac{pb}{RT}$	**AIEEE-2012**
If Z is a compressibility factor, van der Waals' equation at low pressure can be written as– $Z = 1 - \frac{a}{VRT}$	**[JEE Main 2014]**
The behavior of real gas approaches ideal behavior at– **high temperature, low pressure**	**J & K CET-(2013, 2003, 2000) COMEDK 2016**
The units of van der Waals constants a and b respectively are– **L^2 atm mol^{-2} and mol^{-1} L**	**J & K CET-(2008)**
In Van der Waals' equation of state of the gas law, the constant 'b' is a measure of– **volume occupied by the molecules**	**JCECE – 2008 Manipal-2016 JCECE - 2010**

TEAMSPY

Search on TG: @apna_pdf

@apna_pdf

If a gas expands at constant temperature, it indicates that– **kinetic energy of molecules remains same**	**JCECE - 2013**
The compressibility of a gas is less than unity at STP, therefore– $V_m < 22.4$ L	**JIPMER-2017**
a/V^2 given in Van der Waal's equation is for– **inter molecular attraction**	**JIPMER-2005**
The pressure of real gases is less than that of ideal gas because of– **Intermolecular attraction**	**Karnataka-CET-2017**
The type of attractive forces that operate between gaseous HCl molecules is– **dipole-dipole forces**	**Kerala-CEE-2020**
In van der Waals' equation of state for a non-ideal gas, the term that accounts for intermolecular forces is– $\left(P+\frac{a}{V^2}\right)$	**NEET-1990**
At low pressure and high temperature, the van der waal's equation is finally reduced (simplified) to– $pV_m=RT$	**UPTU/UPSEE-2017**
A Van der Waals' gas may behave ideally when– **the pressure is very low**	**WB-JEE-2013**
For a van der Waals' gas, the term $\left(\frac{ab}{V^2}\right)$ represents some– **energy**	**WB-JEE-2019**
The Kinetic energy of one mole of any gas depends upon _____ – **absolute temperature of the gas**	**AP EAPCET 24.08.2021, Shift-I**
Three flasks of equal volumes contain CH_4, CO_2 & Cl_2 gases respectively. They will contain equal number of molecules if_____– **Temperature & Pressure of all the flasks are same**	**AP EAPCET 20.08.2021 Shift-II**
The kinetic energy of 4 moles of nitrogen gas at 127°C is….. cals. $\left(R = 2\text{cal mol}^{-1}K^{-1}\right)$ – **4800**	**AP-EAMCET (Medical), 2003**
At critical state, the compressibility factor (Z) for a real gas is equal to– $\frac{3}{8}$	**AIIMS-26 May, 2018 (M)**
The compressibility factor of an ideal gas is:– **1**	**AIIMS-1997**
Above the Boyle temperature, the compressibility factor of the real gases, Z is– **Z > 1**	**AMU-2013**
The kinetic energy of one mole of a gas is– $\frac{3}{2}RT$	AMU 2002
Magnitude of kinetic energy in an orbit is equal to:– **half of the potential energy**	**BCECE-2005**
According to the kinetic theory of gases, in an ideal gas, between two successive collisions a gas molecule travels– **In a straight line path**	**[AIEEE 2003]**
According to kinetic theory of gases– **the absolute temperature is a measure of kinetic energy of molecules**	**J & K CET-(2001)**
The kinetic energy of a gas molecule is ..... temperature– **directly proportional to**	**Manipal-2019**
Internal energy and pressure of a gas per unit volume are related as– $P=\frac{2}{3}E$	**NEET-1993**
If a gas expands at constant temperature, it indicates that– **Kinetic energy of molecules remains the same**	**NEET-2008**
Average molar kinetic energy of CO and N_2 at same temperature is– $KE_1 = KE_2$	**NEET-2000**
The order of interactions – **Van der Waal's < Hydrogen bonding < Dipole-dipole < Covalent**	**NEET-1993**
The rate of diffusion of a gas in a diffusion tube is $\frac{1}{2\sqrt{7}}$. Molecular weight of the gas (in g mol^{-1})– **28**	**A-P EAMCET 1992**

Search on TG: @apna_pdf

@apna_pdf

At 27ºC, the ratio of root mean square velocities of ozone to oxygen is– $\sqrt{\frac{2}{3}}$	**A-P EAMCET 1992**
The root mean square velocity of a gas is doubled when the temperature is– **increased four times**	**AP – EAMCET - (Medical)-1997** **A-P EAMCET 1996**
The R.M.S. velocity of CH_4, He and SO_2 are in the ratio of– **2:4:1**	**COMEDK 2012**
If the density ratio of O_2 and H_2 is 16:1, then ration of their V_{rms} will be– **1 : 4**	**Assam CEE-2014** **AIIMS-1994** **BITSAT 2008**
The gas molecules having equal total kinetic energy and translational kinetic energy – **He**	**AIIMS-1996**
For the diffusion of a gas at pressure P, the rate of diffusion is expressed by:– $\mathbf{r \propto \frac{1}{\sqrt{M}}}$	**AIIMS-1998**
The root mean square velocity of an ideal gas at constant pressure varies with density (d) as– $\sqrt{\frac{1}{d}}$	**AMU-2015** **WB-JEE-2008**
The temperature of a gas is raised from 27°C to 927°C, the root mean square velocity is– **doubled**	**Assam CEE-2020** **AP EAPCET 20.08.2021 Shift-II**
The average kinetic energy of an ideal gas per molecule in SI unit at 25^0C will be– **6.17×10^{-21} J**	**BITSAT 2016** **NEET-1996**
Increasing order of rms velocities of H_2, O_2, N_2 and HBr is– **$HBr < O_2 < N_2 < H_2$**	**BITSAT 2013** **AMU – 2008** **NEET-1991**
The molecular velocity of any gas is– **Directly proportional to square root of temperature**	**[AIEEE 2011]**
The average velocity (in cm/s) of hydrogen molecule at **27°C** will be– **17.6×10^4**	**JIPMER-2009**
The rms velocity of hydrogen is $\sqrt{7}$ times the rms velocity of nitrogen. If T is the temperature of the gas, then – $\mathbf{T_{N_2} = 2T_{H_2}}$	**Karnataka-CET-2011**

Deviation from ideal gas behavior and liquefaction of gases

Real gases approach the ideal gas behaviour at– **High temperature and low pressure**	**AP-EAMCET- (Engg.)-2011**
An ideal gas can't be liquefied because– **forces operated between its molecules are negligible**	**BITSAT 2012** **BCECE-2010**
When the temperature is raised, the viscosity of liquid decreases this is because– **increased attraction between molecules**	**BITSAT 2010**
A gas at high temperature is cooled. The highest temperature at which liquefaction of gas first occurs is called.– **critical temperature**	**J & K CET-(2015)**
The surface tension of liquids is determined by – **single capillary method**	**J & K CET-(2007)**
A gas can be liquefied– **below its critical temperature**	**UP CPMT-2009**
A gas can be liquefied at temperature T and pressure P provided– **$T < T_C$ and $P > P_c$**	**WB-JEE-2015**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

5. Equilibrium

Equilibrium in Physical Processes

- For the physical equilibrium $H_2O(s) \rightleftharpoons H_2O(l)$ is true– **More of ice melts if pressure on the system is increased**
- A reaction reaches a state of equilibrium only when– **The products react together at the same rate at they are formed**
- Attainment of equilibrium in a coloured gaseous reversible reaction is detected by the constancy of– **Colour**
- Is not a general characteristic of equilibrium involving physical processes– **Measurable properties of the system keep changing**
- The characteristic of a reversible reaction is – **It can never proceed to completion**
- A reaction is said to be in equilibrium when– **The rate of transformation of reactants to products is equal to the rate of transformation of products to the reactants**
- The irreversible reaction is a– $\mathbf{2KClO_3 \rightarrow 2KCl + O_2}$
- The reversible reaction is a:– **$CaCO_3$ heated in a closed vessel**

Law of Chemical Equilibrium and Equilibrium Constant (K)

- In the dissociation of PCl_5 are– $PCl_5(g) \rightarrow PCl_2(g) + Cl_2(g)$, If the degree of dissociation is α at equilibrium pressure "P", then the equilibrium constant for the reaction is– $\mathbf{K_p = \frac{\alpha^2 p^2}{1-\alpha^2}}$
- For the equilibrium. $2NO(g) + Cl_2(g) \rightleftharpoons 2NOCl(g)$ K_P is related to K_c by the reaction– $\mathbf{Kp = \frac{K_c}{RT}}$
- the reaction $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$ goes to completion in lime kiln because of the – **CO_2 escapes continuously**
- For reactions ivolving gaseous reactants and products the equilibrium constant K_P is written in terms of– **The partial pressures of the gases**
- The value of K_c for the reaction $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ depends on– **Temperature**
- K_c for the reaction $N_2 + 3H_2 \rightleftharpoons 2NH_2$ is K then the value of K_c for the reaction $2NH_3 \rightleftharpoons N_2 + 3H_2$ will be– **1/K**
- In the reaction $H_2(g) + I_2(g) \rightarrow 2HI(g)$– $\mathbf{K_p = K_c}$
- K_P for the reaction $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$ is– $\mathbf{K_P = P_{CO_2}}$
- The equilibrium constant for the reaction A $\rightleftharpoons$ B is K. The equilibrium constant for the reaction mA $\rightleftharpoons$ mB is– $\mathbf{K^m}$
- For the homogeneous reaction $4NH_3(g) + 5O_2(g) \rightleftharpoons 4NO(g) + 6H_2O(g)$ the equilibrium constant K_c has the unit of– **Conc**
- The unit of K_p for the reaction is – $CS_2(g) + 4H_2(g) \rightleftharpoons CH_4(g) + 2H_2S(g)$– $\mathbf{atm^{-2}}$
- The degree of dissociation of PCl_5– **Decreases with increasing pressure**
- The gaseous reactions K_P is less than K_c–$\mathbf{2SO_2 + O_2 \rightleftharpoons 2SO_3}$
- The unit of equilibrium constant (K_c) in general is– $\mathbf{(Mole/lit)^{\Delta n}}$
- For the reaction $CO(g) + Cl_2(g) \rightleftharpoons COCl_2(g)$, K_p/K_c is equal to– **1/RT**
- $NH_2COONH_4(s) \rightleftharpoons 2NH_3(g) + CO_2(g)$ If equilibrium presure is 3 atm for the above reaction, K_p will be– **4**
- The K_p of the reaction is $NH_4HS(s) \rightleftharpoons NH_3(g) + H_2S(g)$, it the total pressure at equilibrium is 30 atm– $\mathbf{225\ atm^2}$

Application of Equilibrium Constant

- Predict the effect of increased pressure on reaction's equilibrium. $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$–

Search on TG: @apna_pdf
@apna_pdf

- The conditions will favour maximum formation of the product in the reaction,
  $A_2(g) + B_2(g) \rightleftharpoons X_2(g)\ \Delta_r H = -X$ kJ
  Low temperature and high pressure
- ..... causes the change in the value of equilibrium constant of any equilibria– **Decreasing the temperature**
- In melting ice, the conditions will be more favourable– **High temperature and high pressure**
- For the reversible reaction,
  $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) + \text{heat}.$
  The equilibrium shifts in forward direction– **By increasing pressure and decreasing temperature**
- The value of ΔH for the reaction
  $X_2(g) + 4Y_2(g) \rightleftharpoons 2XY_4(g)$ is less than zero. Formation of $XY_4(g)$ will be favoured at– **High pressure and low temperature**
  Equilibrium shift to the right
- Given exothermic reaction
  $Co\,Cl_4^{2-} + 6H_2O_{(l)} \rightleftharpoons [Co(H_2O)_6]^{2+} + 4Cl^-$
  the one of will decrease the equilibrium concentration of $Co\,Cl_4^{2-}$ –
  The solution is diluted with water
- Reaction, $2BaO_2(g) \rightleftharpoons 2BaO(s) + O_2(g)$; ΔH = +ve
  In equilibrium condition, pressure of O_2 depends upon–
  Increased temperature of equilibrium
- The reaction favored at low pressure is–
  $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$
- For a reversible reaction, if the concentrations of the reactants are doubled, then the equilibrium constant value– **Remains the same**
- An increase in pressure would favour the forward reaction– **$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$**
- In the reaction $NH_4SH(s) \rightleftharpoons NH_3(g) + H_2S(g)$ on doubling the concentration of ammonia the equilibrium concentration of H_2S is–
  Reduced to half to its initial value
- With increase in temperature, the value of equilibrium constant– **May increase or decrease**
- The equilibrium constants of a reaction at 298 K and 308 K are 1.0×10^{-2} and 2×10^{-2} respectively, the reaction is– **Endothermic**
- The reaction goes to more completion– **$K_c = 10^{10}$**
- For a system to be in equilibrium, ΔG = 0 under conditions of constant– **Temperature and pressure**
- Law of mass action cannot be applied to–
  Transition of Rhombic Sulphur to Monoclinic sulphur
- In a system: $A(s) \rightleftharpoons 2B(g) + 3C(g)$. If the concentration of C at equilibrium is increased by a factor 2, it will cause the equilibrium concentration of B to change to– **$\frac{1}{2\sqrt{2}}$ time of its original value**
- A catalyst is introduced into a reversible reaction–
  Attains equilibrium quickly
- The equilibrium constant of a reaction is 300, if the volume of the reaction flask is tripled, the equilibrium constant will be– **300**

Acids, Bases and Salts, Ionization of Acids and Bases, Buffer Solutions

- The strongest acid in the- **$HClO_4$**
- The order of basic strength is–
  $H_2O < CH_3OH < OH^- < CH_3O^-$
- $H_3O^+ + OH^- \rightarrow 2H_2O$ is– **Bronsted neutralisation**
- The no. of conjugate acid-base pairs present in the aqueous solution of H_3PO_3 is– **3**
- The conjugate base of $H_2P\,O_4^-$ is– **$HP\,O_4^{2-}$**
- The conjugate base is not a – **Oxide ion**
- In the reaction $NH_3 + H_2O \rightleftharpoons NH_4^+ + OH^-$, the conjugate acid-base pair is– **NH_4^+ and NH_3**
- The conjugate base of hydrazoic acid is– **N_3**
- Conjugate base of $[Al(H_2O)_6]^{3+}$ is– **$[Al(H_2O)_5OH]^{2+}$**
- The Bronsted acid that has the weakest conjugate base is– **HCl**
- The strong elecrolyte is a – **$BaCl_2$**
- Degree of dissociation of 0.1N CH_3COOH is ($K_{acid} = 1 \times 10^{-5}$)– **$10^{-2}$**
- Extent of ionisation depends upon– **Dilution**
- If NaOH is added to a solution of acetic acid–
  $[CH_3COO^-]$ increases
- 100 ml of HCl + 35 ml of NaOH, colour of methyl orange in the solution will be– **Red**
- For anionic hydrolysis, pH is given by–
  $\frac{1}{2}pK_w + \frac{1}{2}pK_a + \frac{1}{2}\log c$
- The salts will not change the pH of pure water on dissociation– **KCl**
- The happens to ionic product of H_2O as temperature increases – **Increases**
- The aqueous solution of HCOONa, $C_6H_5NH_3^+Cl^{-1}$ and KCN are respectively– **Basic, acidic, basic**
- At 25°C, the $[H^+]$ of a solution is 2×10^{-9} M. The nature of the solution is– **Basic**
- The pair will show common ion effect is–
  $NH_4OH + NH_4Cl$
- The pairs constitutes a buffer is –
  HNO_2 and $NaNO_2$
- The combinations will constitute buffer solution is–
  CH_3COOH/CH_3COONa

TEAM SPY

Search on TG: @apna_pdf
@apna_pdf

- The buffer solution is a – **HCl/NaCl**
- A buffer solution is used in– **The removal of PO_4^{3-} ions**
- The mixed solution of pthalic acid and potassium hydrogen pthalate is– **Acid buffer**
- The mixture in aqueous solution of equimolar concentration acts as a buffer solution– **NH_4OH (excess) + HCl**
- For an acid buffer solution, the pH is 3. The pH can be increased by– **Increasing the concentration of salt**

Solubility Equilibria of SparinglySoluble Salts

- The metal sulphide has maximum solubility is water– **FeS($K_{sp} = 11 \times 10^{-20}$)**
- If the solubility of Ag_2CrO_4 is mole/litre. Its solubility product is– **$4S^3$**
- K_{sp} of salt A_3B_2, for solublity x mol L^{-1}, is– **$108\ x^5$**
- For the electrolyte of type, A_2B, K_{sp} is given then its solubility is calculated by– $\sqrt[3]{\frac{K_{xp}}{4}}$
- For a reversible reaction $A \underset{K_2}{\overset{K_1}{\rightleftharpoons}} B$, the initial molar concentration of A & B are aM and bM, respectively. If the equilibrium concentration are (a – x) & (b + x) respectively, express x in terms of K_1, K_2, a, b– $\frac{K_1a - K_2b}{K_1 + K_2}$
- Log $\frac{K_P}{K_c}$ + log RT = 0. This relationship is valid for the reaction– $2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$
- Variation, of equilibrium constant K_c with temperature is given by– **Vant Hoff equation**
- The solubility of sparingly soluble salt A_1B_2 (having molar mass = mg/mol) in water is X g/L. The ratio of molar concentration of B^{3-} to the K_{sp} of the salt is– $\frac{M^4}{54X^4}$
- The highest pH in water– **Na_2CO_3**
- The should have maximum pH value is– **Milk of magnesia**
- The equilibrium reactions, the equilibrium would shift to the right side, if total pressure is decreased– **$N_2O_4 \rightleftharpoons 2NO_2$**
- Manufacture of ammonia by Haber's process involves the reaction $N_2 + 3H_2 \rightleftharpoons 2NH_3$; $\Delta H = -22.4$ kcals. The effect of increase of temperature on the equilibrium is– **Equilibrium is shifted to the left**
- In the third group of qualitative analysis, the precipitating reagent is NH_4Cl + NH_4OH. The function of NH_4Cl is to– **Supress the ionization of NH_4OH**
- Le chatelier's principle is not applicable to the– **$Fe(s) + S(s) \rightleftharpoons FeS(s)$**
- We know that the relationship between K_c and K_p is $K_p = K_c(RT)^{\Delta n}$ What would be the value of Δn_g for the reaction $NH_4Cl(s) \rightleftharpoons NH_3(g) + HCl(g)$– **2**
- For the reaction, $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$, the standard free energy is $\Delta G° > 0$. The equilibrium constant (K) would be– **K < 1**
- In solvents is silver chloride most soluble– **Aqueous ammonia**
- In reactions, the equilibrium remains unffected on addition of small amount of argon at constant volume is– **The equilibrium will remain unaffected in all the three cases**
- HCl was passed through a solution of $CaCl_2$, $MgCl_2$ and NaCl. compound (s) crystallies(s) is– **Only NaCl**
- The salt solutions is basic in nature– **]Sodium acetate**
- Conjugate base for Bronsted acids H_2O and HF are– **OH^- and F^-, respectively**
- Boric acid is an acid because its molecule– **Accept OH^- from water releasing proton**
- The salts will give highest pH in water is– **Na_2CO_3**
- The species acts only as a base is– **S^{2-}**
- The molecules acts as a Lewis acid is– **$(CH_3)_3$ B**
- In HS^-, I^-, R – NH_2, NH_3 order of proton accepting tendency will be– **$R - NH_2 > NH_3 > HS^- > I^-$**
- The fluoro-compounds is most likely to behave as a Lewis base– **PF_3**
- A small amount of HCl is added to a buffer solution of acetic acid and sodium acetate– **Dissociation of acetic acid decreases**
- A buffer solution can be obtained from– **HCl and KCN, CH_3COONH_4, NH_4Cl and NH_4OH**
- Buffer solutions have constant acidity and alkalinity because– **These give unionised acid or base on reaction with added acid or alkali**
- Conjugate acid of NH_2^- – **NH_3**
- The addition of solid sodium carbonate to pure water causes– **An increase in pH**
- A salt of strong acid and weak base is dissolved in water. Its hydrogen in solution is– **Suppressed by adding strong acid**

Search on TG: @apna_pdf
@apna_pdf

- The salts undergoes hydrolysis is– **CH_3COONa**
- Degree of hydrolysis (h) of a salt of weak acid and a strong base is given by– **$h = \sqrt{\frac{K_a}{c}}$**
- Solubility product principle can be applied when– **Any ionic compound is sparingly soluble in a liquid**
- Precipitation occurs only if I.P (Ionic Product)– **Exceeds K_{sp}**
- An example of a salt dissolved in water to give acidic solution is– **Ammonium chloride**
- The pH value of blood does not appreciable change by a small addition of an acid or base, because the blood–**Contains serum protein which acts as buffer**
- The equilibrium between water and its vapour, in an open vessel– **Cannot be achieved**
- A reaction is said to be in equilibrium– **The rate of transformation of reactants to products is equal to the rate of transformation of products to the reactants**
- The concentrations of PCl_5, PCl_3 and Cl_2 become constant at - **equilibrium point**
- In the relation, $K_p = K_e (RT)^{\Delta n}$ the value of Δn is – **Number of moles of gaseous products - number of moles of gaseous reactants in a balanced equation**
- The correct relationship between free energy change in a reaction and the corresponding equilibrium constant, K_e is– **$-\Delta G^0 = RT \ln k_c$**
- The reaction $2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$ + Heat, will be favoured by– **Low temperature and high pressure**
- According to Lewis concept, an acid is a/an– **Electron pair acceptor**
- The conjugate acid of SO_4^{2-} is– **HSO_4^-**
- The species that can act both as an acid as well as a base– **Amphoteric**
- The salts that will give basic solution on hydrolysis is– **K_2CO_3**
- Acidity of BF_3 can be explained on the basis of– **Lewis concept**
- The solvents is silver chloride most soluble is– **Aqueous ammonia**
- In base vs acid titration, at the end point methyl orange is present as– **Quinonoid form**
- For the reaction, $H_2 + I_2 \rightleftharpoons 2HI$, K = 47.6. If the initial number of moles of each reactant and product is 1 mole then at equilibrium– **$[I_2] = [H_2]$, $[I_2] < [HI]$**
- Conjugate base for Bronsted acids H_2O and HF are– **OH^- and F^-, respectively**

EXAM POINT

Equilibrium in physical process

The equilibrium expression for the reaction, $P_4(s) + 5O_2(g) \rightleftharpoons P_4O_{10}(s)$ is – **$K_c = \frac{1}{[O_2]^5}$**	**JCECE - 2008, UPTU/UPSEE-2007**
The rate, substance reacts, depends upon its– **active mass**	**AMU-2001, AIIMS-1996**
By applying law of mass action, the equilibrium constant K for the reaction $HA + H_2O \rightleftharpoons H_3O^+ + A^-$– **$K = \frac{[H_3O^+][A^-]}{[HA][H_2O]}$**	**J & K CET-(2007)**
In the equilibrium reaction, $A(g) + 2B(g) \rightleftharpoons C(g) + D(g)$, the equilibrium constant, K_c is given by the expression– **$K_c = \frac{[C][D]}{[A][B]^2}$**	**AP-EAMCET-1994**

Law of Chemical Equilibrium and Equilibrium Constant (k)

The reversible reaction, is concentration of the reactants is reduced to half, the equilibrium constant will be ..... .– **remains same**	**AP EAMCET (Engg.) 18.09.2020, Shift-I** **AP EAMCET (Engg.) 21.09.2020, Shift-II**
For the reaction $A(g) \rightleftharpoons C(g) + D(g)$; $\Delta H = -Q$ kJ. The equilibrium constant cannot be disturbed by– **Increasing of pressure**	**Kerala-CEE-29.08.2021**

Search on TG: @apna_pdf
@apna_pdf

A catalyst substance is a – **Shortens the time to reach equilibrium**	**AP EAPCET 24.08.2021 Shift-II**
The reaction is carried out at standard states then at the equilibrium _____– **Equilibrium Const K = 1**	**AP EAPCET 23-08-2021 Shift-I**
In the equilibrium, $H_2+I_2 \rightleftharpoons 2HI$, if at a given temperature the concentrations of the reactants are increased, the value of the equilibrium constant, K_c, will– **remain the same**	**WB-JEE-2019**
Change in volume of the system does not alter the number of moles of the equilibrium is – $\mathbf{N_2(g)+O_2(g) \rightleftharpoons 2NO(g)}$	**BCECE-2018**
For the reaction, $2HI(g) \rightleftharpoons H_2(g)+I_2(g)$ the degree fo dissociation (α) of HI (g) is related to equilibrium constant K_p by the expression– $\mathbf{\frac{2\sqrt{K_p}}{1+2\sqrt{K_p}}}$	**UPTU/UPSEE-2017**
The equilibrium is not affected by an increase in pressure is– $\mathbf{3Fe(s)+4H_2O(g) \rightleftharpoons Fe_3O_4(s)+4H_2(g)}$	**UPTU/UPSEE-2016**
The equilibrium constant for $N_2(g)+O_2(g) \rightleftharpoons 2NO(g)$ is K the equilibrium constant for $\frac{1}{2}N_2(g)+\frac{1}{2}O_2(g) \rightleftharpoons NO(g)$ will be– $\mathbf{K^{1/2}}$	**NEET-2015**
If the value of equilibrium constant for a particular reaction is 1.6×10^{12}, then at equilibrium the system will contain– **Mostly products**	**NEET-2015 Cancelled**
The mixture of reactants and products in the equilibrium state is called– **equilibrium mixture**	**J & K CET-(2014)**
The thermodynamic equilibrium constant, K_a for the reaction: $CuO(s) + H_2(g) \rightleftharpoons Cu(s) + H_2O(g)$ is given by– $\mathbf{K=\frac{[H_2O]}{[H_2]}}$	**AMU-2013**
The equilibrium constants for the reaction, $Br_2 \rightleftharpoons 2Br$ at 500 K and 700 K are 1×10^{-10} and 1×10^{-5} respectively. The reaction is– **endothermic**	**UPTU/UPSEE-2013**
For a gas in equilibrium with a liquid, the ratio of the concentration of the gas in the solution plase to that in the gaseous phase is constant at constant temperature, only if molecules undergo– **isolation**	**UPTU/UPSEE-2012**
Reaction, $BaO_2(s) \rightleftharpoons BaO(s)+O_2(g); \Delta H = +ve$. In equilibrium condition, pressure of O_2 depends on– **increased temperature of equilibrium**	**BCECE-2012**
The homogeneous reaction. $4NH_3+5O_2 \rightleftharpoons 4NO+6H_2O$ The equilibrium constant K_c has the units– **conc.$^{+1}$**	**JIMPER-2012**
The reaction, $N_2(g)+O_2(g) \rightleftharpoons 2NO(g)+180.7\,kJ$, on increasing the temperature, the production of NO– **increases**	**BCECE-2011**
In the reversible reaction. $2NO_2 \underset{k_2}{\overset{k_1}{\rightleftharpoons}} N_2O_4$ the rate of disappearance of NO_2 is equal to– $\mathbf{2k_1[NO_2]^2 - k_2[N_2O_4]}$	**VITEEE- 2011**
The unit of equilibrium constant for the reaction is $2NO_2(g) \rightleftharpoons N_2O_4(g)$– **L mol^{-1}**	**UPTU/UPSEE-2011**
In a reversible reaction, at equilibrium, the net heat change of the reaction is– **zero**	**AP-EAMCET(MEDICAL)-2009**
For the reaction $2HI(g) \rightleftharpoons H_2(g)+I_2(g)-Q$ kJ, the equilibrium constant depends upon– **temperature**	**Karnataka-CET, 2008**

Search on TG: @apna_pdf

@apna_pdf

On doubling p and V with constant temperature, the equilibrium constant will– **remain constant**	**BCECE-2008**
The equilibrium constant of the reaction $aA + bB \rightleftharpoons cC + dD$ is K the equilibrium constant of the reaction, $ncC + ndD \rightleftharpoons naA + nbB$, will be– $\frac{1}{K^n}$	AMU-2007
The reactions is an example of reversible reaction is – **$KNO_3(aq)+NaCl(aq) \rightarrow KCl(aq)+NaNO_3(aq)$**	**SRMJEEE – 2007**
Equation $\log\frac{K_2}{K_1}=\frac{\Delta H}{2.303R}\left(\frac{T_2-T_1}{T_1T_2}\right)$, n is – **Kirchoff's equation**	**CG PET -2006**
The equilibrium $P_4(g) + 6Cl_2(g) \rightleftharpoons 4PCl_3(g)$ is attained by mixing equal moles of P_4 and Cl_2 in an evacuated vessel. Then, at equilibrium– **$[P_4] > [Cl_2]$**	**J & K CET-(2004)**
The term- (dc/dt) in a rate equation refers to the– **decreases in concentration of the reactant with time**	**CG PET -2004**
If the rate expression for a chemical reaction is given by rate = $k[A]^m[B]^n$– **the order of the reaction is m + n**	**CG PET -2004**
The rate of a chemical reaction :– **decrease as the reaction proceeds**	**BCECE-2003**
The equilibrium constant for the reaction $N_2 + 3H_2 \rightleftharpoons 2NH_3$ is K, then the equilibrium constant for the equilibrium $2NH_3 \rightleftharpoons N_2+3H_2$ is,– $\frac{1}{K}$	**NEET-1996**
An open beaker of water in equilibrium with water vapour is in a sealed container. When few grams of glucose are added to the beaker of water, the rate at water molecules– **leaves the vapour increases**	**JEE-Main-02.09.2020, Shift-I**
The gaseous reaction, $H_2 + I_2 \rightleftharpoons 2HI$, the equilibrium constant is – **$K_p = K_c$**	**CG PET - 2006, 2005 BCECE - 2006 JCECE - 2005**
In the reaction, $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$, relation between K_p and K_c is– **$K_p = K_c$**	**J&K CET-2008 AP-EAMCET-1992**
For the reaction $H_2(g)+I_2(g) \rightarrow 2HI(g)$, the equilibrium constant K_p changes with– **temperature**	**VITEEE- 2007 J & K CET-(2011)**
The relation between K_p and K_c is shown as– **$K_p = K_c(RT)^{\Delta n_g}$**	**BCECE-2009 CG PET -2004**
The expression for the equilibrium constant reaction: $2X(g) + Y(g) \rightleftharpoons 3Z(g)$ is– $K=\frac{[Z]^3}{[X]^2[Y]}$	**AP EAPCET-23-08-2021, Shift-I**
K_p/K_c for the reaction, $A(g) + 2B(g) \rightleftharpoons AB_2(g)$ is– **$1/(RT)^2$**	**J & K CET-(2015)**
At equilibrium, if $K_p = 1$, then– **$\Delta G^o = 0$**	**UPTU/UPSEE-2013**
At room temperature, for the reaction $NH_4SH(s) \rightleftharpoons NH_3(g) + H_2S(g)$– **$K_p > K_c$**	**J & K CET-(2012)**
The reaction, $2NH_3(g) \rightleftharpoons N_2(g)+3H_2(g)$ the units of K_p will be– **$(atm)^2$**	**UP CPMT-2011**
For a chemical reaction $A + B \rightleftharpoons C$, the thermodynamic equilibrium constant K_p is– **in atm^{-1}**	**JCECE - 2011**
In an equilibrium reaction, if Δn_g is positive then– **$K_c < K_p$**	**SRMJEEE – 2009**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

For the reaction, $2B + A \rightleftharpoons C$, the equilibrium constant is– $\frac{[C]}{[A][B]^2}$	**BCECE-2009**
For equilibrium $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ K_p and K_c will hold the relationship– **$K_p = K_c(RT)$**	A.M.U. – 2008
$N_2O_4 \rightleftharpoons 2NO_2 - Q$ The unit of K_p for the given reaction is– **atmosphere**	**CG PET -2006**
For the reaction, $CO(g) + Cl_2(g) \rightleftharpoons COCl_2(g)$, the K_p/K_c is equal to– **1/RT**	**AIEEE-2004**

Application of equilibrium constant.

A chemical reaction is catalysed by 'X' therefore, 'X'– **does not affect the equilibrium constant of the reaction**	**CG PET -2006**
The effect of increasing pressure on the dissociation of PCl_5 according to the equation, $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$– **Dissociation decreases**	**Tripura JEE-2022** **UPTU/UPSEE-2004**
On doubling P and V with constant temperature the equilibrium constant will– **remain constant**	**UP CPMT-2007** **UPTU/UPSEE-2004**
Le-Chateliar's principle is not applicable to – **$Fe(s) + S(s) \rightleftharpoons Fe(s)$**	**AP EAPCET 20.08.2021 Shift-I** **AMU-2011**
The yield of the products in the reaction, $A_2(g) + 2B(g) \rightleftharpoons C(g) + Q(kJ)$ would be higher at– **low temperature and high pressure**	**NEET-2018** **Karnataka-CET-2013**
The supply of oxygen to tissues by blood, can be explained by– **Le-Chatelier's principle**	**AP EAMCET (Engg.) 21.09.2020, Shift-II**
$CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$ at constant temp, the pressure will increase if:– **Temperature increases**	**AIIMS-27.05.2018-(E)**
A reaction has both ΔH and ΔS –ve. The rate of reaction– **Increases with decreases in temperature**	**Karnataka-CET-2017**
The reaction, $CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$ at a given temperature the equilibrium amount of $CO_2(g)$ can be increased by– **increasing the amount of $CO_{(g)}$.**	**J & K CET-(2017)**
The chemical equilibrium, $2NO_2(g) \rightleftharpoons N_2O_4(g) + 14.6kcal$ increase in temperature :– **favours the decomposition of N_2O_4**	**Manipal-2016**
The reaction $SO_2 + O_2 \rightleftharpoons 2SO_3 + Heat$ The equilibrium reaction proceeds in forward direction by– **addition of O_2**	**UPTU/UPSEE-2015**
The according to Le-Chatelier's principle is – **Increase in temperature favours the endothermic reaction**	**BITSAT 2015**
The reactions, increase in pressure will favour the forward reaction is – **$2NO(g) + O_2(g) \rightleftharpoons 2NO_2(g)$**	**J & K CET-(2013)**
According to Le-Chartelier's principle, the equilibrium constant of a reversible reaction will not shift by– **The effect of a catalyst**	**J & K CET-(2012)**
The reaction, $SO_2Cl_2(g) \rightleftharpoons SO_2(g) + Cl_2(g)$ If at equilibrium volume of the reaction vessel is increased then the amount of– **Cl_2 will increase**	**SRMJEEE – 2012**
The value of ΔH for the reaction $X_2(g) + 4Y_2(g) \rightleftharpoons 2XY_4(g)$ is less than zero formation of $XY_4(g)$ will favoured at– **high pressure and low temperature**	**NEET-2011**
The physical equilibrium is not – **$3O_2 \rightleftharpoons 2O_3$**	**UPTU/UPSEE-2009**
$N_2 + 3H_2 \rightleftharpoons 2NH_3 + heat$. The effect of the increase of temperature on the equilibrium of the reaction is – **Equilibrium is shifted to the left**	**KARNATAKA-CET, 2008**
The yield on application of high pressure in the Haber's synthesis of ammonia is – **Increases**	**J & K CET-(2008)**

Search on TG: @apna_pdf

@apna_pdf

The basic principle of Cottnell's precipitation is– **Neutralization of charge on colloidal particles**	**KARNATAKA-CET, 2008**
For a system in equilibrium, $\Delta G = 0$ under conditions of constant– **temperature and pressure**	**BITSAT 2008**
The hydrogen molecule decompose into it's atoms consitions gives maximum yields of H atoms is – **High temperature and low pressure**	**BITSAT-2007**
The equilibrium reaction that is not influenced by volume change at constant temperature is– $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$	**J & K CET-(2006)**
According to Le-Chatelier's principle factors influence a chemical system is– **concentration, pressure and termperature**	**CG PET -2005**
The pressure increases then its effect on given equilibrium $2NO \rightleftharpoons N_2(g) + O_2(g)$ is shift in:– **No effect**	**BCECE-2005**
A chemical reaction is in equilibrium when– **the rate of forward reaction is equal to the rate of backward reaction**	**CG PET -2005**
If a system is at equilibrium, the rate of forward to the reverse reaction is:– **Equal**	**UPTU/UPSEE-2004**
The pressure is applied to the equilibrium system ice $\rightleftharpoons$ water. Which of the phenomenon will happen is – **More water will be formed**	**BCECE-2004**
The change will shift the reaction towards the product is- $I_2(g) \rightleftharpoons 2I(g), \Delta H_r^0(298K) = +150kJ$ – **Increase in temperature**	**AIIMS-2004**
The increase of pressure affect the equation is $C(s) + H_2O(g) \rightleftharpoons CO(g) + H_2(g)$ – **Shift in the reverse direction**	**J & K CET-(2003)**
Reaction $BaO_2(s) \rightleftharpoons BaO(s) + O_2(g)$; ΔH = + ve. In equilibrium condition pressure of O_2 depends on– **Increase temperature on equilibrium**	**NEET-2002**
In the reaction $O_2(g) + N_2(g) \rightleftharpoons 2NO(g)$, $\Delta H = 180$ KJ. – **Decrease in temperature**	**J & K CET-(2002)**
The equilibrium will be shifted in the opposite direction if $PCl_3(g) + Cl_2(g) \rightleftharpoons PCl_5(g)$ – **Pressure is reduced**	**J & K CET-(2000)**
According to Le Chatelier's principle, adding heat to a solid and liquid in equilibrium will cause the– **amount of solid to decrease**	**NEET-1993**
The information can be obtained in the basis of Le Chatelier principle is– **Shift in equilibrium position of changing value of a constraint**	**NEET-1992**

Acids, Bases and salt and ionization of acids and bases, buffer solutions

For a reaction at equilibrium $A(g) \rightleftharpoons B(g) + \frac{1}{2}C(g)$ The relation between dissociation constant (K), degree of dissociation (α) and equilibrium pressure (p) is given by:– $K = \frac{\alpha^{\frac{3}{2}} p^{\frac{1}{2}}}{(2+\alpha)^{\frac{1}{2}}(1-\alpha)}$	**JEE Main-24.06.2022, Shift-I**
Van't Hoff factor of $Ca(NO_3)_2$ is– **Three**	**J & K CET-(2013) BCECE-2008 UP CPMT-2006**
Precipitation takes place when the product of concentration of ions is– **more than solubility product**	**J & K CET-2005, 2001**
The degree of dissociation (α) of a weak electrolyte, A_xB_y is related to van't Hoff factor (i) by the expression– $\alpha = \frac{i-1}{(x+y-1)}$	**Tripura JEE-2022 [AIEEE 2011]**

Search on TG: @apna_pdf

@apna_pdf

The Van't Hoff factor i for an electrolyte undergoes dissociation and association in solvents are respectively– **greater than 1 and less than 1**	**BITSAT – 2012 NEET-2011**
The degree of dissociated of $PCl_5(\alpha)$ obeying the equilibrium; $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ is related to the pressure (p) at equilibrium by– $\alpha \propto \frac{1}{\sqrt{p}}$	**BITSAT 2016, UP CPMT-2013**
The electrolytes has the same value of Van't Hoff factor (i) as that of $K_4[Fe(CN)_6]$ is – **$Al_2(SO_4)_3$**	**JIMPER-2018 NEET-1994**
The acids has the smallest dissociation constant is – **$BrCH_2CH_2COOH$**	**JCECE - 2011 WB JEE-2008**
For a concentrated solution of a weak electrolyte A_xB_y, the degree of dissociation is given as– $\alpha = (K_{eq}/C^{x+y-1}x^x y^y)^{1/(x+y)}$	**Kerala-CEE-2008 AMU-2011**
The successive equilibrium constant for the stepwise dissociation of a tribasic acid are K_1, K_2, and K_3, respectively. The equilibrium constant for the overall dissociation is– $K_1 \times K_2 \times K_3$	**TS-EAMCET (Engg.), 06.08.2021**
If in the reaction, $N_2O_4 \rightleftharpoons 2NO_2$; α is the degree of dissociation of N_2O_4, then total number of moles at equilibrium is :– $(1 + \alpha)$	**Manipal-2020**
Relationship between Van't Hoff's factor (*i*) and degree of dissociation (α) is– $\alpha = \frac{i-1}{n'-1}$	**MHT CET-02.05.2019, SHIFT-II**
The Van't Hoff's factor '*i*' accounts for– **extent of dissociation of solute**	**Karnataka-CET-2017**
The electrolyte is dissociated in solution, the van't Hoff's factor (i) is– **> 1**	**Karnataka-CET-2016**
The compounds have the same value of Van't Hoff's factor (*i*) as that of $Al_2(SO_4)_3$– **$K_4[Fe(CN)_6]$**	**COMEDK-2015**
The compound possesses the C—H bond with the lowest bond dissociation energy is – **Toluene**	**Karnataka-CET-2015**
The value of vant Hoff's factor for $Hg_2(NO_3)_2$ is– **3**	**UP CPMT-2014**
The van't Hoff factor (*i*) for a dilute aqueous solution of sucrose is– **1.0**	**J & K CET-(2011)**
The compounds corresponds to Van't Hoff factor (*i*) to be equal to 2 for dilute solution – **$MgSO_4$**	**JCECE - 2011**
Van't Hoff factor of aq K_2SO_4 at infinite dilution has value equal to– **3**	AMU-2009
Degree of dissociation of 0.1 N CH_3COOH is ($K_{acid} = 1 \times 10^5$)– **10^{-2}**	**UP CPMT-2006**
If α is the degree of dissociation of Na_2SO_4 , the van't Hoff factor (*i*) used for calculating the molecular mass is– **$1 + 2\alpha$**	**AIEEE-2005**
When NH_4Cl is added to NH_4OH solution, the dissociation of ammonium hydroxide is reduced. it is due to– **common ion effect**	**CG PET-2004**
The salt has value of the van't Hoff factor equal to that of K_3 $[Fe(CN)_6]$ is– **$Al(NO_3)_3$**	**J & K CET-(2002)**
The van't Hoff factor (i) for a dilute aqueous solution of the strong electrolyte barium hydroxide is– **3**	**(NEET-II-2016)**
The equilibrium constant (K) of a reaction may be written as– $K = e^{-\Delta G^0/RT}$	**WB-JEE-2009**
For the equilibrium $H_2O(l) \rightleftharpoons H_2O(g)$ at 1 atm and 298 K:– **free energy change is less than zero ($\Delta G<0$)**	**AIIMS-2004**
Arrhenius equation is :– $K = Ae^{-E_a/RT}$	**BCECE-2006**
In terms of Arrhenius equation, $k = Ae^{-E_a/RT}$ the temperature dependence of rate constant (k) of a chemical reaction is written. Then, the activation energy (E_a) of the reaction can be calculate by plotting.– $\log k$ vs $\frac{1}{T}$	**BCECE-2015**

Search on TG: @apna_pdf

@apna_pdf

The Arrhenius equation gives the dependence of the rate constant of a chemical reaction of the absolute temperature and may be expressed as $K = Ae^{-E_a/RT}$. If the unit of K is s^{-1} the unit of A will be– **s^{-1}**	**CG PET-2019**
The activation energy for a simple chemical reaction $A \rightarrow B$ is E_a in forward direction. They activation energy for reverse reaction– **can be less than or more than E_a**	**UPTU/UPSEE-2018 CG PET -2007**
According to Arrhenius equation. The slope of $\log K$ vs $\frac{1}{T}$ plot is…..– **$\frac{-E_a}{2.303R}$**	**MHT CET-2018 JIPMER- 2017 GUJCET-2014**
Aqueous solution of the compound the best conductor of electric current – **Hydrochloric acid, HCl**	**NEET-2015**
The oxides: Na_2O, As_2O_3, N_2O, NO and Cl_2O_7 Number of amphoteric oxides is:– **1**	**JEE Main-24.06.2022, Shift-I**
In case of Bronsted base, the order of basic strength is– **$ClO^- > ClO_2^- > ClO_3^- > ClO_4^-$**	**CG PET-22.05.2022**
The conjugate acid of N_3^- (azide ion) is:– **HN_3**	**AP-EAMCET (Med.)-1999**
Aqueous solution of $FeCl_3$ is acidic because of– **cationic hydrolysis**	**AP-EAMCET-1991**
The conjugate base of HSO_4^- ion is ….– **SO_4^{2-}**	**AP-EAMCET-1991**
The nature of 0.1 M solution of sodium bisulphate is– **acidic**	**AP-EAMCET-1993**
The least likely to act as a Lewis base– **I^+**	**AP-EAMCET-1995**
The conjugate base of NH_2^- is– **NH_2^-**	**AP-EAMCET-1998**
The salts gives an acidic solution in water is – **NH_4Cl**	**AP-EAMCET-2007**
A conjugate acid base pair is not– **$H_2PO_4^-, PO_3^{3-}$**	**AP EAMCET (Engg.) - 2007**
Molten sodium chloride conducts electricity through:– **free ions**	**MPPET - 2012**
The conjugate acid of NH_3 is:– **NH_4^+**	**MPPET-2012**
A particular aqueous solution is diluted by a factor of ten with K_2O the pH increases by one unit, the solution most likely contains a– **Strong acid**	**SCRA-2014**
The aqueous solution is not basic– **CH_3COONa**	**SCRA 2010**
In the reaction $H_2O + HCl \rightarrow H_3O^+ + Cl^-$, the species that acts as Bronsted base is:– **H_2O**	**MPPET-2013**
The species acts as both Bronsted acid and base are– **HSO_4^-**	**AP-EAMCET 25-08-2021 Shift - I**
The highest pK_a value is – **HF**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
Iron sulphide is heated in air to form A, an oxide of sulphur. A is dissolved in water to give an acid. The basicity of this acid is– **2**	**AP EAMCET-2002**
A Lewis acid is – **PF_3**	**MPPET-2008**
The salts will produce an alkaline solution on dissolving in water– **Na_2CO_3**	**MPPET-2008**
The strongest Bronsted base is– **ClO^-**	**MPPET-2008**
Using the Lewis concept, the strongest acidic strength– **H_3PO_4**	**SCRA-2009**
$SiCl_4$ on hydrolysis forms 'X' and HCl, compound 'X' losses water at 1000°C and gives 'Y'. Compounds 'X' and 'Y' respectively are– **H_4SiO_4, SiO_2**	**AP EAMCET (Engg.)-2009**
The double salts is not– **Li_2SO_4**	**AP EAPCET 20.08.2021 Shift-I**
The salts give an acidic solution in water– **NH_4Cl**	**AP EAMCET (Engg.) - 2007**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

Rochelle's salt is–	**sodium potassium tartarate**	**COMEDK-2011**
In the titration of oxalic acid against sodium hydroxide the indicator used is–	**phenolphthalein**	**COMEDK-2011**
The conjugate acid of HCO_3^- is–	**H_2CO_3**	**COMEDK-2011**
According to the Lewis theory an acid is a–	**electron pair acceptor**	**COMEDK-2011**
The elements 'X', 'Y' and 'Z' form oxides are acidic, basic and amphoteric respectively. The order of their electro negativity is–	**X > Z > Y**	**AP-EAMCET (Medical), 2008**
The salts form is micelle–	**Sodium stearate**	**AP-EAMCET (Medical), 2001**
The compound having maximum value of pK_a is–	**C_6H_5OH**	**GUJCET-2021**
The molar concentrations of base and its conjugate acid are same, the pOH of the buffer solution is–	**same as pK_b of base**	**TS EAMCET 04.08.2021, Shift-I**
The set of amphoteric oxides among the given oxides are Ga_2O_3, As_4O_{10}, Sb_4O_{10}, B_2O_3, Tl_2O–	**Ga_2O_3, As_4O_{10}, Sb_4O_{10}**	**TS EAMCET 04.08.2021, Shift-I**
The $K_2Cr_2O_7$ is –	**It is stable in both acid & base**	AIIMS 26 May 2019 (Evening)
A Lewis-acid is –	**Ag^+**	**AIIMS-1994**
The strongest base is –	**HCO_3^-**	**AIIMS-1996**
The strongest bronsted base anions is–	**ClO^-**	**AIIMS-1996**
The acid-base titration, pH is greater than 8 at equivalence point–	**Acetic acid versus sodium hydroxide**	**AIIMS-(2003)**
Lewis acid is–	**BF_3**	**AIIMS-(1998)**
In the reaction $I_2 + I^- \rightarrow I_3^-$, the Lewis base is:–	**I^-**	**BCECE-2005, AIIMS-(1997)**
The pairs is not an acidic buffer–	**$HClO_4$ & $NaClO_4$**	**AP EAPCET 19-08-2021, Shift-II**
The basic character is –	**$P(CH_3)_3 > PH_3$**	**AP-EAMCET (Engg.) 2015**
The compounds is Lewis acid is –	**BCl_3**	**AP – EAMCET - (Medical)-1997**
The strongest conjugate base results from'–	**Acetylene**	**AP-EAMCET-1998 AP – EAMCET - (Medical)-1997**
The oxide is amphoteric–	**SnO_2**	**VITEEE- 2012**
The conjugate acid of O^{2-} is–	**OH^-**	**AMU-2019**
The acids is used as an oxidizer in rocket fuel–	**HNO_3**	**AMU-2014**
The electrophiles from species: BF_3, NH_3, Me_3C^+, HCl–	**BF_3 and Me_3C^+**	**AMU-2013**
For a diprotic acid, the true for 1st and 2nd ionization constants (K_{a_1} and K_{a_2}) –	**$K_{a_1} > K_{a_2}$**	**AMU-2012**
The strongest base is–	**CsOH**	**AMU-2012**
The conjugate bases will be the most acidic in nature–	**HSO_4^-**	AMU – 2008
A solution of $FeCl_3$ in water acts as acidic solution due to:–	**hydrolysis of Fe^{3+}**	**BCECE-2006**
Arrange NH_4^+, H_2O, H_3O^+, HF and OH^- in increasing order of acidic nature :–	**$OH^- < H_2O < NH_4^+ < HF < H_3O^+$**	**BCECE-2006**
CH_3COO^- ion is a–	**strong conjugate base**	**BCECE-2011**

Search on TG: @apna_pdf

@apna_pdf

Nature of nitride ion is–	**basic**	**BCECE-2013**
The least likely to act as Lewis base is–	**BF_3**	**BITSAT 2010**
The increasing order of Bronsted bases–	**$ClO_4^- < ClO_3^- < ClO_2^- < ClO^-$**	**BITSAT-2015**
The compound gives saccharin acid when it reacts with conc. HNO_3 is–	**Glucose**	**CG PET-2019**
The element from group 15 gives most basic compound with hydrogen is–	**Nitrogen**	**CG PET-2007**
The acid present in vinegar is–	**CH_3COOH**	**CG PET-2004**
Strongest Bronsted base is–	**ClO^-**	**CG PET-2006, 2004**
The pH of water decreases with–	**Increase in temperature**	**CG PET-2005**
The aqueous solution is basic–	**NaOCl**	**CG PET-2005**
The weakest acid is–	**CH_3COOH**	**CG PET-2010**
The ligand is ambidentate NO_3^- (P), NO_2^- (Q), CN^- (R), SCN^- (S) –	**R and S**	**GUJCET-2022**
The salts is most basic in aqueous solution–	**CH_3COOK**	**JEE Main-2018**
The Lewis acids is–	**BCl_3 and $AlCl_3$**	**JEE Main 2018**
The conjugate base of OH^- is-	**H_2O**	**[AIEEE-2005]**
The conjugate base of $H_2PO_4^-$ is–	**HPO_4^{2-}**	**[AIEEE-2003]**
The amphoteric oxide is–	**Al_2O_3**	**J & K CET-(2001)**
The Lewis acid is–	**$AlCl_3$**	**J & K CET-(2013)**
Both Bronsted acid as well as Bronsted base is–	**H_2O**	**J & K CET-(2011)**
According to Lowry and Bronsted, the strength of an acid depends upon–	**The tendency to donate protons**	**J & K CET-(2007)**
A Lewis acid is–	**HCl**	**J & K CET-(2005)**
The strongest Lewis acid is –	**BI_3**	**J & K CET-(2002)**
A Lewis base is–	**NH_3**	**J & K CET-(2002)**
The conjugate acid of NH_2^- is–	**NH_3**	**J & K CET-(1999)**
Mohr's salt is:–	**$FeSO_4.(NH_4)_2SO_4.6H_2O$**	**JCECE - 2004**
The strongest Bronsted base is–	ClO^-	**UPTU/UPSEE-2014** **JCECE - 2010**
The salt when dissolved in water gets hydrolysed–	**NH_4Cl**	**JCECE - 2011**
Conjugate base of hydrazoic acid is–	**N_3^-**	**JCECE - 2011**
The species can act as the strongest base –	**OR^-**	**JCECE - 2013**
Species acting both as Bronsted acid and base is–	**HSO_4^-**	**JCECE - 2014**
Least likely to behave as Lewis base–	**BF_3**	**JIPMER-2014**
The strongest base is –	**CH_3O^-**	**Karnataka-CET-2020**
Acidity of BF_3 can be explained on the concepts –	**Lewis concept**	**Karnataka-CET-2018**
A species is not a Bronsted acid but a Lewis acid.–	**BF_3**	**Karnataka-CET-2013**
Conc. H_2SO_4 is heated with P_2O_5, the acid is converted into–	**sulphur trioxide**	**Karnataka-CET-2007**
The oxides is amphoteric–	**ZnO**	**Kerala-CEE-2004**
The weak monobasic acid–	**H_3BO_3**	**Kerala-CEE-2012**
Amphoteric oxide is–	**Cr_2O_3**	**Kerala-CEE-2012**

TEAM SPY

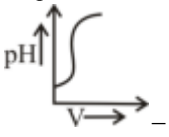
Search on TG: @apna_pdf

@apna_pdf

Hard acids prefer to combine with–	**Hard bases**	**Kerala-CEE-2019**
In hydrolysis of a salt of weak acid and strong base, $A^- + H_2O \rightleftharpoons HA^- + OH^-$, the hydrolysis constant (K_h) is equal to:–	$\frac{K_w}{K_a}$	**Manipal-2019**
The conjugate base of the acid H_2S is:–	**HS^-**	**Manipal-2017**
The element that forms amphoteric oxide is–	**Zinc**	**MHT CET-2018**
The basicity of orthophosphorous acid is–	**Two**	**MHT CET-2015**
The product of molar concentrations of hydrogen ions and hydroxide ions in a 0.01 M aqueous solution of sodium chloride is known as–	**Ionic product of water**	**MHT CET-2014**
A weak acid is–	**CH_3COOH**	**MHT CET-2012**
The conjugate acid of HS^- is–	**H_2S**	**MHT CET-2012**
The salts will not undergo hydrolysis–	**KNO_3**	**MHT CET-2011**
Solutions in test tubes containing H_2O and aqueous NaOH can be differentiated with the help of:–	**red litmus**	**NDA (I)-2011**
Concentrated H_2SO_4 splits of the surface, it should be immediately cleaned:–	**by adding solid Na_2CO_3**	**NDA (I)-2011**
A bee-sting leaves an acid which causes pain and irritation. The injected acid is:–	**methanoic acid**	**NDA (I)-2011**
NH_4Cl is acidic due to–	**Cationic hydrolysis**	**MHT CET-2010**
Conjugate acid-base pair differ by–	**Proton**	**MHT CET-2010**
Reaction for the formation of NaCl is–	$Na(s) + \frac{1}{2}Cl_2(g) \longrightarrow NaCl(s)$	**MHT CET-2010**
The weakest base is–	**Ammonia**	**MHT CET-2008**
Lemon gives sour taste because of–	**Citric acid**	**MHT CET-2007**
The hydrolysis of sodium carbonate involves the reaction between–	**CO_3^{2-} and water**	**MHT CET-2007**
Conjugate base for Bronsted acids H_2O and HF are–	**OH^- and F^-, respectively**	**NEET-2019**
Both as Bronsted acid and as Bronsted base is–	**HCl**	**Odisha NEET-2019**
The fluoro-compound is most likely to behave as a Lewis base–	**PF_3**	**NEET-II 2016**
Act as Lewis base is–	**BF_3**	**NEET-2016**
The strongest acid is–	**$HClO_4$**	**NEET-2013**
The molecular hydrides acts as Lewis acid–	**B_2H_6**	**NEET-2010**
The molecules acts as a Lewis acid is –	**$(CH_3)_3B$**	**NEET-2009**
The compounds is not a protonic acid–	**$B(OH)_3$**	**NEET-2003**
In HS^-, I^-, $R–NH_2$, NH_3 order of proton accepting tendency will be–	**$R–NH_2 > NH_3 > HS^- > I^-$**	**UPTU/UPSEE-2007 NEET-2000**
Compound is electron deficient–	**BCl_3**	**COMEDK-2012, NEET-2000**
The stronger conjugate base is–	**CH_3COO^-**	**NEET-1999**
Repeated use of fertilizers would increase the acidity of the soil–	**Ammonium sulphate**	**NEET-1998**
The species acts as a Lewis but not a Bronsted acid is–	**BF_3**	**UP CPMT-2014**
Two acids A and B have pK_a 4 and 6, then–	**A is 10 times stronger than B**	**UP CPMT-2009**
The order of basic strength is–	**$NaOH > Mg(OH)_2 > Al(OH)_3$**	**UP CPMT-2009**
Cationic hydrolysis gives the solution–	**Basic**	**UP CPMT-2005**

Search on TG: @apna_pdf

@apna_pdf

Hydrolysis of sodium acetate gives– **Basic solution**	**UP CPMT-2005**
Amphoteric solvent is– **Water**	**UPTU/UPSEE-2004**
Would gaseous HCl be considered as an Arrhenius acid– **No**	**UPTU/UPSEE-2004**
The pair of salt produces odourless gas with dil. H_2SO_4– **HCO_3^- and CO_3^-**	**UPTU/UPSEE-2018**
The Bronsted acid in equation $PO_4^{3-} + H_2O(l) \longrightarrow HPO_4^{2-}(aq) + OH^-(aq)$ – **H_2O**	**UPTU/UPSEE-2017**
The strongest Bronsted base is– **ClO^-**	**UPTU/UPSEE-2014**
The weakest acid is– **HF**	**UPTU/UPSEE-2009**
The chemical reaction of water is behaving as a base– **$H_2SO_4 + H_2O \longrightarrow H_3O^+ + HSO_4^-$**	**UPTU/UPSEE-2009**
The behaves as Lewis acid and not as Bronsted acid is – **SO_3**	**UPTU/UPSEE-2009**
The principle use of hydrofluoric acid is– **in etching glass**	**NDA (II)-2017**
The strongest Bronsted acid in a aqueous solution is– **$HClO_3$**	**WB-JEE-2017**
The properties is true for a tooth paste– **It is basic**	**NDA (I)-2018**
The set of oxides are arranged in the proper order of basic, amphoteric, acidic– **BaO, Al_2O_3, SO_2**	**WB-JEE-2018**
The solution that is made by mixing appropriate amount of a weak acid and salt is called– **Acidic buffer**	**AP-EAMCET-1992**
The solutions tend to keep the concentration of hydrogen ions constant even when small amount of strong acid or strong base are added to them, are known as– **Buffer solution**	**AP-EAMCET-1993**
The solutions cannot act as a buffer– **HCl + NH_4Cl**	**AP-EAMCET-1998**
The acid buffer [salt = S, acid = A] is– **$pH = pK_a + \log\frac{[S]}{[A]}$**	**AP-EAMCET-2000**
An acidic buffer solution could be prepared by mixing the solutions - **Ammonium chloride and ammonium hydroxide**	**MPPET-2012**
The pairs constitute a buffer– **HNO_2 & $NaNO_2$**	**AP EAPCET 24.08.2021, Shift-I**
The Henderson's equation for a basic buffer is– **$pOH = pK_b + \log\frac{[Salt]}{[Base]}$**	**Manipal-2018 COMEDK-2011**
A buffer solution is– **$NH_4OH + NH_4Cl$**	**COMEDK-2016**
$H_2 + CO + \text{alkene} \xrightarrow{\text{catalyst}} 1^\circ\text{alcohol}$, the stable intermediate and the nature of the reaction– **aldehyde, reduction**	**TS EAMCET 04.08.2021, Shift-I**
During titration of acetic acid with aq. NaOH solution, the neutralisation graph has a vertical line. This line indicates  – **alkaline nature of equivalence**	**AIIMS- 2007**
Buffer solutions have constant acidity and alkalinity because– **These give unionised acid or base on reaction with added acid on alkali**	**NEET-2012**
In the hydrolysis of a salt of weak acid and weak base, the hydrolysis constant (K_t) is equal to– **$\frac{K_w}{K_a.K_b}$**	**COMEDK-2016**

TEAM SIV

Search on TG: @apna_pdf

@apna_pdf

A ten fold increase in the $[H^+]$ of a solution– **decreases its pH by one unit**	**AMU-2012**
An aqueous solution whose pH is zero will be called as– **acidic**	AMU-2009
The solution has pH = 7 – **NaCl + H_2O**	AMU-2008
The OH^- ion concentration of as solution having pH 2 is– **1×10^{-12} M**	AMU-2004
The term pH comes from– **"pure voiv hydrogen" which implies potential of hydrogen**	AMU-2002
The pH of a 0.1 M solution of NH_4OH (having $k_b = 1.0\times10^{-5}$) is equal to– **11**	**MHT CET-2008**
When ammonium chloride is added to ammonia solution, the pH of the resulting solution will be– **decreased**	**MHT CET-2007**
The order of pH of solutions of $CuSO_4$, NaCN, NaCl and water is– **$CuSO_4$ < NaCl = H_2O < NaCN**	**AP - EAMCET(MEDICAL) - 2009**
The pH of a 10^{-8} molar solution of HCl in water is– **between 6 and 7**	**MHT CET-2007**
The Compound water solution has the highest pH is– **Na_2CO_3**	**NEET-2002, 1988**
The pH value of N/10 NaOH solution is– **13**	**NEET-1995**
The pH value of a 10 M solution of HCl is– **less than 0**	**NEET-1995**
The pair will not show common ion effect– **H_2S + HNO_3**	**CG PET-22.05.2022**
When common salt is added to a saturated solution of soap, soap is precipitated. This is based on the principle of– **common ion effect**	**COMEDK-2018**
The common ion effect is shown– **NH_4OH + NH_4Cl**	AMU–2001
The highest proton affinity is– **NH_3**	**[AIEEE-2003]**
The relation between dissociation constant of a dibasic acid is– **$K_{a_1} > K_{a_2}$**	**NEET-2000**
The pairs of ions cannot be separated by H_2S in dilute HCl– **Bi^{3+}, Sn^{4+}**	**UPTU/UPSEE-2013**
When common salt is dissolved in water,– **the boiling point of the solution increases**	**UPTU/UPSEE-2010**
The pairs will show common ion effect– **ammonium hydroxide + ammonium chloride**	**UPTU/UPSEE-2010**

Solubility equlibria of a sparingly soluble salts

The solubility of AgCl will be maximum in– **Deionized water**	**JEE Main-29.06.2022, Shift-I**
The dielectric constants of H_2O and D_2O are 82 and 80.5 respectively. Therefore, the solubility of NaCl in D_2O is ..... than in water:– **Slightly less**	**AP-EAMCET (Med.)-1999**
The ionic product of water $[H^+]$ $[OH^-]$ is– **10^{-14}**	**AIMMS- 25.05.2019, Shift-II** **AP-EAMCET-1993**
Insoluble in water in– **Magnesium fluoride**	AP-EAMCET-2007
The solubility of A_2X_3 is 'y' M. Its solubility product is ..... M– **$108y^5$**	**AP EAMCET (Engg.) 17.09.2020, Shift-II**
The ionic product of water ..... with increase in temperature.– **increases**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
The maximum solubility at low pH is– **$Sr(OH)_2$**	AIIMS-25.05.2019 (Morning)
Only As^{3+} gets precipitated as As_2S_3 and not Zn^{2+} as ZnS when H_2S is passed through an acidic solution containing $As^{3+}$and Zn^{2+}– **Solubility product of As_2S_3 is less than that of ZnS.**	**JIPMER-2018**

Search on TG: @apna_pdf

@apna_pdf

Three sparingly soluble salts M_2X, MX and MX_3 have same value of solubility product. Their solubilities follow the order– **$MX_3 > M_2X > MX$**	**Assam CEE-2014**
The principle involved in the classification of basic radicals, is :– **solubility product**	**BCECE-2006**
When H_2S is passed in acidic medium in solution having CuS and ZnS, only CuS is precipitated because– **$K_{sp}CuS << K_{sp}$ ZnS**	**BITSAT-2005**
The K_{sp} of CuS, Ag_2S and HgS are 10^{-31}, 10^{-44} and 10^{-54} respectively. The solubility of these sulphides are in the order:– **$Ag_2S > CuS > HgS$**	**BITSAT-2010**
For a sparingly soluble salt A_pB_q, the relationship of its solubility product $Ls \rightarrow K_{sp}$ with its solubility (S) is– **$Ls = S_{p+q}.P_pq_q$**	**BITSAT-2016**
If solubility of $M(OH)_3$ is S, its solubility product will be:– **$27S^4$**	**CG PET -2019, 2013**
The product of H^+ and OH^- of water will be– **$K_w = 10^{-14}$**	**CG PET -2006**
Solubility product of pure $PbC1_2$ will be– **$K_{sp} = 4S^3$**	**CG PET -2006, BCECE-2003**
The inert gas is soluble in water– **Xe**	**CG PET -2006**
Solubility of $Ca(OH)_2$ is S mol L^{-1}. The solubility product (K_{sp}) under the same condition is– **$4S^3$**	**[AIEEE-2002]**
The equation relating solubility and solubility product for the sparingly soluble salt with the general molecular formula AB_2 is– **$S = 2^{-2/3}[K_{sp}]^{1/3}$**	**J & K CET-(2016)**
The order of solubility of the sulphates of alkaline earth metals in water is–**Be > M**	**J & K CET-(2004)**
If the solubility of a sparingly soluble salt AX_2 is s mol/lit., the solubility product is– **$4s^3$**	**J & K CET-(2015)**
The solubility of $Fe(OH)_3$ is *x* mol L^{-1}. Its K_{sp} would be– **$27\,x^4$**	**J & K CET-(2013)**
The salts is most soluble– **MnS ($K_{sp} = 7 \times 10^{-16}$)**	**J & K CET-(2003)**
Ostwald dilution law is applicable to– **weak electrolytes only**	**J & K CET-(2003)**
When HCl gas is passed through a saturated solution of NaCl (brine), then the solubility of NaC*l*– **increases**	**J & K CET-(2000)**
The solubility product of Hg_2I_2 is equal to– **$[Hg_2^{2+}]\ [I^-]^2$**	**JIPMER-2012**
The expression for the solubility product of Ag_2CO_3 will be– **$K_{sp}=4s^3$**	**JIPMER-2011**
The solubility of saturated solution of $Ag_2\ CrO_4$ is s mol L^{-1}. What is its solubility product– **$4s^3$**	**JIPMER-2010**
The solubility decreases with increase in temperature in– **Na_2SO_4**	**MHT CET-03.05.2019, SHIFT-I**
Solubility of the solids in water changes slightly with temperature is– NaBr	**MHT CET-2017**
Solubility of $Ca(OH)_2$ is s mol L^{-1} . The solubility product (K_{sp}) under the same condition is– **$4s^3$**	**MHT CET-2008**
The solubility product of CuS, Ag_2S and HgS are 10^{-31}, 10^{-44} and 10^{-54} respectively. The solubilities of these sulphides are in the order– **$Ag_2S > CuS > HgS$**	**NEET-1997**
Aqueous solutions of acetic acid contains– **CH_3COO^- and CH_3COOH**	**NEET-1991**
The value of the ionic product of water depends:– **on temperature**	**UPTU/UPSEE-2006**
The solubility of AgI in NaI solution is less than that in pure water because– **Of common ion effect**	**UPTU/UPSEE-2014 JCECE - 2014**
At a certain temperature, the solubility of the salt, M_mA_n in water is s mol/L. The solubility product of the salt is– **$m^m n^n s^{m+n}$**	**UPTU/UPSEE-2010**
The arrangements in respect of solubility in water – **$BeSO_4 > MgSO_4 > CaSO_4 > SrSO_4 > BaSO_4$**	**WB-JEE-2016**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

6. The Solid State

Amorphous and crystalline solids

- The major binding force in diamond, silicon and quartz is– **Covalent bond force**
- Carbon dioxide forms a molecular solid- **After solidified**
- Quartz is a - **Covalent crystal**
- Quartz is used as a- **Piezoelectric material**
- The crystal having alternate tetrahedral voids are occupied in – **ZnS**
- The crystalline structure of NaCl is– **Face centred cubic**
- A match box exhibits– **Orthorhombic geometry**
- The unit cell has maximum number of atoms– **Fcc**
- The structure of CsCl crystal has – **Body centred cubic type**
- Monoclinic sulphur is an example of monoclinic crystal system and the characteristic of the crystal system is – **$a \neq b \neq c$, $\alpha = \gamma = 90°$, $\beta \neq 90°$**
- If in a crystal lattice of a compound, each corner of cube is enjoyed by sodium, each edge centre of a cube has oxygen and centre of cube is enjoyed by Tungsten (W), then a formula of crystal is– **$NaWO_3$**
- Bravais lattice are of– **14 types**
- The number of atoms per unit cell of bcc structure is– **2**
- A compound of "A" and "B" crystallises in a cubic lattice , the 'A' atoms occupy the lattice points at the corners of the cube. The 'B' atom occupy the centre of each face of the cube. The probable empirical formula of the compound is– **AB_3**
- Coordination number of Cs^+ and Cl^- in CsCl crystal are– **8, 8**
- The chloride ions are surrounding sodium ion in sodium chloride crystal– **6**
- A unit cell of $BaCl_2$ (Fluorite structure) is made up of– **Eight Ba^{2+} ions and four Cl^- ion**
- If the radius of an octahedral void is r and radius of atoms in close packing is R, the relation between r and R is– **r = 0.414 R**
- In the unit cell of NaCl– **Only octahedral sites are occupied**
- The number of tetrahderal and octahedral voids in a CCP array of 100 atoms are respectively– **200 and 100**
- Zn convert it's melted state to its solid state, it has hcp structure, then the co-ordination number is – **12**
- An electron trapped in an anionic site in a crystal is called– **F-centre**
- Fe_3O_4 (magnetite) is an example of– **Inverse spinel structure**
- In a schottky defect– **Some lattice sites are vacant**
- Cations are present in the interstitial sites in– **Frenkel defect**
- Dislocation defect is also known as – **Frenkel defect**
- The appearance of colour in solid alkali metal halids is generally due to– **F-centres**
- The yellow colour of ZnO and conduction nature produced in heating is due to– **Metal excess defect due to interstitial cation**
- Schottky defect is observed in the crystal of– **NaCl**
- Silicon doped with electron-rich impurity forms– **n-type semiconductors**
- Pure silicon and germanium behave as– **Insulators**
- p-type semiconductors are formed when Si or Ge are doped with– **Group 13 elements**
- To get n-type of semiconductor, germanium should be doped with– **Arsenic**
- MnO metal oxides is- **antiferromagnetic nature**
- Fe_3O_4 is ferrimagnetic at room temperature but at 850K, it becomes– **Paramagnetic**
- Some of the polar crystals on heating produces small electrical current, this phenomenon is called– **Pyroelectricity**
- An example of body centred cube is– **sodium**
- In NaCl crystal, the number of next nearest neighbours of each Na^+ ion is– **12 Na^+ ions**
- In a tetragonal crystal– **$\alpha = \beta = \gamma = 90°$, $a = b \neq c$**
- Diamond has exactly ZnS packing of carbon atoms. How many C-atoms are present in on unit cell– **8**
- The substance all magnetic domains are aligned in one direction to help it for becoming permanent magnet is – **Ferromagnetic substances**
- Solid CO_2 (dry ice) is an example of– **Molecular solid**
- The portion of edge length not occupied by atoms for simpe cubic, fcc and bcc are respectively (a is edge length)– **$0; a\left(1-\frac{1}{\sqrt{2}}\right); a\left(1-\frac{\sqrt{3}}{2}\right)$**

Search on TG: @apna_pdf

@apna_pdf

- An alloy of Cu, Au and Ag is found to have Cu constituting the ccp lattice. If Ag atoms occupy edge centres and Au is present at body centres, the alloy has formula– **$Cu_4 Ag_3 Au$**

Classification of crystalline solids

- **Ice** may have- **Hexagonal crystals**
- Low temperature favours the existence of a substance in the- **Solid state**
- Quartz glass (SiO_2) is an- **amorphous solid**
- The refractive index of quartz glass is – **Same in all directions**
- The sharp melting point of crystalline solids is due to–**A regular arrangement of constituent particles observed over a long distance in the crystal lattice**
- Iodine molecules are held in the crystals lattice by– **London forces**
- Diamond is a - **Network solid**
- Graphite is a good conductor of electricity due to the presence of– **Free valence electrons**
- The oxides behaves as conductor or insulator depending upn temperature– **TiO_3**
- The lattice site in a pure crystal can not be occupied by– **Electron**
- Graphite cannot be classifed as– **Ionic solid**
- Cations are present in the interstitial sites in– **Frenkel defect**
- Schottky defect is observed in crystals that is – **Equal number of cations and anions are missing from the lattice sites**
- To get a n-type semiconductor from silicon, it should be doped with a substance with valency– **5**
- The total number of tetrahedral voids in the face centred unit cell is– **8**
- The most efficient packing is present in– **hcp and ccp**
- The percentage of empty sapce in a body centred cubic arrangement is– **32**
- The coordination number in a square close packed structure in two dimensions is – **3**
- The defects are introduced by doping is –**Electronic defect**
- Silicon doped with electron rich impurity forms – **n-type semiconductor**
- A ferromagnetic substance becomes a permanent magnet when it is placed in a magnetic field because– **All the domains get oriented in the direction of magnetic field**
- The order of the packing efficiency in different types of unit cells is– **Fcc > bcc > simple cubic**
- In the cubic close packing, the unit cell has– **8 terahedral voids within the unit cells**
- The edge lengths of the unit cells in terms of the radius of spheres consituting fcc, bcc and simple cubic unit cells are respectively– $2\sqrt{2}r, \frac{4r}{\sqrt{3}}, 2r$
- The order of conductivity in solids is – $K_{metals} >> K_{insulators} < K_{semiconductros}$
- Amorphous solids can also be called as – **Pseudo solids, Super cooled liquids**
- Frenkel defect is also known as– **Stoichiometric defect, Dislocation defect**
- The number of tetrahedral and octahedral voids in hexagonal primitive unit cell are– **12, 6**
- The number of body Centered unit cells in all 14 types of Bravais lattice unit cells is - **3**

Crystal lattice, unit cell calculating, No. of atoms in a unit cell

- The crystal is represented by $a \neq b \neq c$ and $\alpha \neq \beta \neq \gamma \neq 90^o$– **Triclinic**
- Copper belongs to a crystal system represented by the crystal dimensions as– **$\alpha = \beta = \gamma = 90^o$, a = b = c**
- The relation between diamond and graphite is– **Polymorphous**
- Maximum possible numbers of two dimensional and three dimensional lattices are respectively– **5 and 14**
- A solid with formula ABC_3 would probably have– **A at corners of cube, B at body centre, C at face centre**
- Solids will have the highest melting point– **Network covalent solid**
- Amorphous solid have– **Long range of melting point**
- In a unit cell, atoms A, B, C and D are present at corners, face-centres, body-centre and edge-centre respectively in a cubic unit cell. The total number of atoms present per unit cell is– **8**
- Number of atoms per unit cell, if atoms are present at the corner of unit cell and 2 atoms at each body diagonal– **9**
- ..... has the highest cation to anion size ratio– **CsF**
- In cube of any crystal A-atom placed at every corners and B-atom placed at every centre of face. The formula of compound– **AB_3**
- The ratio of number of rectangular plane and diagonal plane in a cubic unit cell– **1 : 2**
- Glass is a– **Super cooled liquid**

Closed packed structures, Calculation of packing efficiency

- In any ionic crystal A has formed cubical close packing and B atoms are present at every tetrahedral voids. If any sample of crystal contain 'N' number of B atoms then number of B atoms then number of A atoms in that sample is– **N/2**
- A binary solid A^+B^- has a structure with B^- ions constituting the lattice and A^+ ions occupying 25% tetrahedral holes. Formula of the solid is– **A_2B**

TEAM SRV

Search on TG: @apna_pdf

@apna_pdf

- In a crystalline and anions B are arranged in cubic close packing. Cation A are equally distributed between octahedral and tetrahedral voids. If all the octahedral voids are occupied, the formula for the solid is– **A_2B**
- A unit cell is obtained by closed packing layers of atoms in ABAB ..... pattern. The total number of tetrahedral and octahedral voids in the unit cell are respectively– **12, 6**
- In certain solid, the oxide ions are arranged in ccp. Cations A occupy 1/6 of the tetrahedral voids and cation B occupy one-third of the octahedral voids. The probable formula of the compound is– **ABO_3**
- For tetrahedral co-ordination, the radius ratio (r_+/r_-) should be– **0.225 – 0.414**
- A mineral having formula, AB_2 crystallises in the cubic close packed lattice, with the stones occupying the lattice points. Hence coordination number of A and B atoms are– **8, 4**
- An element crystallises in a 'bcc'. Nearest neigbours and next nearest neighbours of the elements are respectively– **8, 6**
- The total number of elements of symmetry in a cubic crystal is– **23**
- A crystal may have one or more planes of symmetry as well as one or more than one axis of symmetry but it has– **Only one centre of symmetry**
- In a ccp type structure, if half of the face-centered atoms are removed, then percentage void cell is approximately– **54%**
- In a BCC unit cell, if half of the atoms per unit cell are removed, then percentage void is– **66%**
- In calcium fluorides, having the fluoride structure, the coordination numbers for calcium ion (Ca^{2+}) and fluoride ion (F^-) are– **8 and 4**
- The number of octahedral void(s) per atom present in a cubic close-packed structure is– **1**
- Percentage of free space in a body centered cubic unit cell is– **32%**
- Coordination number in ABAB..... type arrangement is– **12**
- For face centered cubic structure edge length 'a' can be related with radius 'r' as– **$a = r \times 2\sqrt{2}$**
- In a NaCl structure, If positions of Na atoms and Cl atoms are interchanged, then in the new unit cell– **Cl atom is present in octahedral voids**
- Some of the molecular solids upon heating produces small amount of electricity, hence solid is– **Pyroelectric**
- NaCl becomes paramagnetic at high temperature due to– **Formation of F-centre**
- Second nearest neighbour in CsCl solid– **6**
- In a calcium fluoride structure, the co-ordination number of cation and anion is respectively– **8, 4**
- ..... density increases– **In Impurity defect**
- If a is the length of the side of a cube, the distance between the body centered atom and one corner atom in the cube will be– **$\frac{\sqrt{3}}{4}a$**
- The number of carbon atoms per unit cell of diamond unit cell is– **8**
- In a face-centered cubic lattice, a unit cell is shared equally by ..... unit cells– **6**
- In a CsCl structure, if edge length is a, then distance between one Cs atom and one Cl atom is– **$\frac{a\sqrt{3}}{2}$**

Imperfection of Defects in solids, Electrical and magnetic properties:

- Pyroelectric crystals produce feeble electric current– **On heating**
- Zinc oxide on heating changes to yellow. This is because– **Zinc oxide shows metal excessive defect**
- F-centres in an ionic crystals are– **Lattice sites containing elecrons**
- When an element of group 14 is doped with an element of group 15– **n-type of semi-conductors are formed**
- Substances with are magnetic but having less magnetic moment than theoretically calculated value are called– **Ferrimagnetic**
- In antiferromagnetism– **Alignments of magnetic moments in one direction is compensated by alignments in the opposite direction**
- They produce an electric current when a mechanical stress is applied– **Piezoelectric crystals**
- When a crystal having rock salt type geometry is heated in the presence of it's metal vapour then defect in it will be– **Metal excess defect**
- On rising temperature and decreasing pressure in CsCl solid– **Number of formula unit per cell (Z) changes from one to four**
- With ..... elements should be doped so as to give p-type of semiconductor– **Boron**
- Ionic solids, with Schottky defects, contain in their structure– **Equal number of cation and anion vacancies**
- Schottky defect in crystals is observed– **Equal number of cations and anions are missing from the lattice**
- The appearance of colour in solid alkali metal halides is generally due to– **F-centres**

Search on TG: @apna_pdf

@apna_pdf

- Ionic solids conduct electricity in molten state but not in solid state because– **In molten state, free ions are furnished which are not free to move in solid state**
- Solid X is a very hard solid which is electrical insulator in solid as well as in molten state and has extremely high melting point. The type of solid is it– **Covalent solid**
- The solids is the structure of CsCl crystal is– **Body centred cubic**
- The type of crystals contains more than one Bravais lattice is– **Monoclinic**
- Monoclinic sulphur is an example of monoclinic crystal system. The characteristics of the crystal system is– $\mathbf{a \neq b \neq c, \alpha = \gamma = 90^0, \beta \neq 90^0}$
- In ABC ABC packing, if the number of atoms in the unit cell is n then the number of tetrahedral voids in the unit cell is equal to– **2n**
- An alloy of copper, silver and gold is found to have copper constituting the ccp lattice. If silver atoms occupy the edge centres and gold is present at body centre, the alloy has a formula– $\mathbf{Cu_4Ag_3Au}$
- In ccp arrangement, the pattern of successive layers can be designated as– **ABC ABC ABC**
- The coordination number of metal crystallising in a hexagonal close packing is– **12**
- A crystalline structure has radius ratio (r^+/r^-) in the range of 0.225 – 0.414. The coordination number and arrangement of anions around the cations are– **4, tetrahedral**
- A solid AB has a rock salt structure. If radius of cation A^+ is 120 pm, the minimum value of radius of B^- anion– **290 pm**
- A crystal is formed by two elements X and Y in cubic structure. X atoms are at the corners of a cube while Y atoms are at the face centre. The formula of the compound will be– $\mathbf{XY_3}$
- If three elements X, Y and Z crystallise in a ccp lattice with X atoms at the corners. Y atoms at the cube cente and Z atoms at the edges, the formula of the compound will be– **XYZ**
- A compound is formed by two elements Y and Z. The element Z forms ccp and atoms Y occupy 1/3 rd of tetrahedral voids. The formula of the compound is– $\mathbf{Y_2Z_3}$
- Total number of chloride ions that are surrounding sodium ion in sodium chloride crystal is– **6**
- In NaCl structure– **Only octahedral sites are occupied**
- NaCl type crystal (with coordination no. 6 : 6) can be converted into CsCl type crystal (with coordination no. 8 : 8) by applying– **High pressure**
- Coordination numbers of Cs^+ and Cl^- in CsCl crystal are– **8, 8**
- In a unit cell of $BaCl_2$ (fluorite structure), the coordination numbers of Ba^{2+} and Cl^- ions are respectively– **8 and 4**
- In face centred cubic unit cell, edge length is– $\frac{4}{\sqrt{2}}r$
- Copper crystallises in fcc with a unit cell length of 361 pm. The radius of copper atom– **127 pm**
- Total volume of atoms present in a fcc unit cell of a metal with radius r is– $\frac{16}{3}\pi r^3$
- The fraction of the total volume occupied by the atoms present in a simple cube is– $\frac{\pi}{6}$
- The effect of Frenkel defect on the density of ionic solids is– **The density of the crystal remains unchanged**
- The type of stoichiometric defect is shown by ZnS is– **Frenkel defect**
- In a Schottky defect– **Some lattice sites are vacant**
- Silver halides generally show– **Both Frenkel and Schottky defects**
- An electron trapped in an anion site in a crystal is called– **F-centre**
- Metal deficiency defect, will have– **FeO**
- Pure silicon and germanium behave as– **Insulators**
- To get n-type of semiconductor, germanium should be doped with– **Arsenic**
- p-type semiconductors are formed when Si or Ge are doped with– **Group 13 elements**
- The conditions that favours the existence of a substance in the solid state– **Low temperature**
- An amorphous solid is– **Quartz glass (SiO_2)**
- The value of refractive index of quartz glass is true about– **Same in all directions**
- Iodine molecules are held in the crystals lattice by—— **London forces**
- Network solid is a– **Diamond**
- Graphite is a good conductor of electricity due to the presence of--------- **Free valence electrons**
- The oxides that behaves as conductor or insulator depending upon temperature– $\mathbf{TiO_3}$
- The oxides that shows electrical properties like metals– $\mathbf{CrO_2}$
- Cations are present in the interstitial sites in------ **Frenkel defect**
- Schottky defect is observed in crystals when ------ **Equal number of cations and anions are missing from the lattice**
- To get a n-type semiconductor from silicon, it should be doped with a substance with valency..... **5**
- The total number of tetrahedral voids in the face centred unit cell is---------- **8**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

- The percentage of empty space in a body centred cubic arrangement is---------- **32**
- The kind of defects that are introduced by doping is– **Electronic defects**
- Silicon doped with electron-rich impurity forms– **n-type semiconductor**
- In the cubic close packing, the unit cell has– **8 tetrahedral voids within the unit cells**
- Right option for the number of tetrahedral and octahedral voids in hexagonal primitive unit cell are– **12, 6**
- The parameters of the unit cell of a substance are a = 2.5, b = 3.0, c = 4.0, $\alpha = 90^0$, $\beta = 120^0$, $\gamma = 90^0$. The crystal system of the substance is– **Monoclinic**
- Amorphous solid is a– **Glass**

EXAM POINT

Amorphous and Crystalline Solids

Graphite is a– **covalent solid**	**BITSAT-2015, JIPMER-2012**
If an element in group-2 formed a compound with an element in group 17 of the periodic table, the compound formed is likely to _____. **be a crystalline solid**	**AP-EAMCET 25-08-2021 Shift - I**
Silicon carbide is example of– **covalent solid**	**JIPMER-2019**
Amorphous solids are characterized by property as– **isotropic**	**AMU-2015**
A crystalline solid X reacts with dil. HCl to liberate a gas Y. Y decolourises acidified $KMnO_4$. When a gas 'Z' is slowly passed into an aqueous solution of Y, colloidal sulphur is obtained X and Z could be respectively– **Na_2SO_3, H_2S**	**Karnataka-CET-2014**
Ionic solid are generally:– **brittle**	**MPPET - 2012**
Dry ice is– **Solid CO_2**	**JCECE - 2007**
Crystalline form of silica is called:– **quartz**	**UPTU/UPSEE-2006**
Quartz is a crystalline variety of– **Silica**	**AP EAMCET- 1997**
The Pure crystalline substance on being heated gradually first forms a turbid liquid at constant temperature and still at higher temperature turbidity completely disappears. The behaviour is a characteristic of substance forming– **Liquid crystals**	**NEET-(1993)**
Glass a– **Supercooled liquid**	**NEET-(1991)**
Most crystals show good cleavage because their atoms, ions or molecules are– **arranged in planes**	**NEET-(1991)**
The ability of a substance to assume two or more crystalline structures is called– **polymorphism**	**NEET-(1990)**

Classification of Crystalline Solid

Example of molecular solid is:– **SO_2(s)**	[AIIMS-27 May, 2018(M)]
The network of solid is – **Diamond**	**JCECE - 2013**
The covalent crystal is – **Quartz**	**Karnataka-CET-2011**
The molecular crystal is– **Dry ice**	**Karnataka-CET, 2010**
A solid X melts slightly above 273 K and is a poor conductor of the heat and electricity, categories belong to – **molecular solid**	AMU–2001
Cation and anion combines in a crystal to form of compound– **ionic**	**NEET-(2000)**

Crystal lattices and unit cells

Vacant space in body centered cubic lattice unit cell is about– **32%**	**Karnataka CET-17.06.2022, Shift-II**
A metal 'X' crystallises in a body centred cubic structure and its metallic radius is 346.4 pm. The length (in pm) of the unit cell is– **800**	**Kerala CEE -03.07.2022**

Search on TG: @apna_pdf

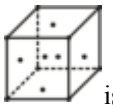
@apna_pdf

An element 'A' has face centred cubic structure with edge length of 361 pm. The radius of atom 'A' is:– **127.6 pm**	**CG PET-22.05.2022**
In FCC, the unit cell is shared equally by how many unity cells– **6**	**Karnataka-CET-2018, 2013 Manipal-2017 JIPMER-2007 NEET-2005**
Sodium atom crystallizes in bcc lattice with cell edge a=4.29Å, the radius of sodium atom is– **1.86 Å**	**AIIMS-2017 JEE MAIN-2015 Karnataka-CET-2015 CG PET- 2013**
An ionic compound has a unit cell consisting of A ions at the corners of a cube and B ions the centres of the faces of the cube. The empirical formula for this compound would be– **AB_3**	**UP CPMT-2011 AIEEE-2005 (NEET-2000)**
The number of atoms in a body centred cubic unit cell is– **2**	**BITSAT-2017 UPTU/UPSEE-2016** AMU-2004
The metal that crystallises in simple cubic system is– **Po**	**MHT CET-2016 VITEEE- 2006**
The number of atoms contained in a fcc unit cell of a monoatomic substance is– **4**	**JIPMER-2012 (NEET-1993)**
The ionic radii of A^+ and B^- ions are 0.98×10^{-10} m and 1.81×10^{-10} m. The coordination number of each ion in AB is– **6**	**(NEET-I-2016) J & K CET-2005**
Copper crystallises in FCC lattice with a unit cell edge of 361 pm. The radius of copper atom is– **128 pm**	**[AIEEE 2011, 2009]**
The lattice points belong to a face centered cubic cell is– **4**	**J&K CET-2012 VITEEE- 2006**
Percentage of free space in bcc lattice is– **32**	**COMEDK-2016 CG-PET-2015**
The dimensions of a unit cell of a crystal are a = 0.387, b = 0.387, c = 0.504 and $\alpha = \beta = 90°$, $\gamma = 120°$ the crystal system is– **hexagonal**	**CG PET- 2013 AIIMS-2004**
The number of octahedral sites per sphere arranged in a face centered cubic structure, is– **2**	**UPTU/UPSEE-2010 CG PET -2005**
An element crystallises in a face-centered cubic (fcc) unit cell with cell edge a. The distance between the centers of two nearest octahedral voids in the crystal lattice is– **$\frac{a}{\sqrt{2}}$**	**[JEE Main 2020, 5 Sep Shift-II] WB-JEE, 2020**
If a, b, c are the lengths of three edges of unit cell, α is the angle between side b and c, β is the angle between side a and c and γ is the angle between side a and b, what is the Bravais Lattice dimensions of a tetragonal crystal– **$a = b \neq c$ and $\alpha = \beta = \gamma = 90°$**	**J & K CET-(2019, 1999)**
Cell edge length in bcc, ccp and simple cubic unit cell is respectively as _____.– **$\frac{4r}{\sqrt{3}}, 2\sqrt{2}\,r, 2r$**	**GUJCET-2021, 2022**
The number of atoms in body centred and face centred cubic unit cell respectively are– **2 and 4**	**WB-JEE-30.04.2022**
A metal crystallizes with a FCC-lattice, the edge of whose unit cell is x pm. The diameter of this metal atom would be _____ pm.– **$\frac{x}{\sqrt{2}}$**	**AP EAPCET 20.08.2021 Shift-II**
The number of translational degrees of freedom for NH_3 (g) is– **3**	**TS-EAMCET 09.08.2021, Shift-I**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

The FCC - crystal contains how many atoms in each unit cell– **4**	**AP EAPCET 19-08-2021, Shift-II**
The parameters of the unit cell of a substance are a = 2.5, b = 3.0, c = 4.0, $\alpha = 90^0$, $\beta = 120^0$, $\gamma = 90^0$. The crystal system of the substance is– **monoclinic**	**[JEE Main 2021, 27 July Shift-I]**
In the face centered unit cell, the lattice points are present at — **The corners and the face centres of the unit cell**	**AP EAPCET 20.08.2021 Shift-I**
In a monoclinic unit cell, the relation of sides and angles are respectively:– **$a \neq b \neq c$ and $\alpha = \gamma = 90^o \neq \beta$**	**BITSAT-2020**
A match box exhibits– **orthorhombic geometry**	**CG PET -2019**
An element has a face-centered cubic (FCC) structure with a cell edge of a. The distance between the centers of two nearest tetrahedral voids in the lattice is– $\frac{a}{2}$	**[JEE Main 2019, 12 April Shift-I]**
The ratio of number of atoms present in a simple cubic, body centered cubic and face centered cubic structure are, respectively.– **1: 2: 4**	**[JEE Main 2019, 12 April Shift-II]**
The primitive unit cell has unequal edge lengths ($a \neq b \neq c$) and all axial angles different from 90º– **Triclinic**	**[JEE Main 2019, 10 Jan Shift-I]**
B^- ions form a close packed structure. If the radius of B^- ion is 200 pm then the cation (A^+) having radii 88 pm can fit into– **octahedral hole**	**AMU-2019**
If a metal crystallises in bcc structure with edge length of unit cell 4.29×10^{-8} cm the radius of metal atom is– **1.86×10^{-8} cm**	**MHT CET-03.05.2019, SHIFT-I**
Edge length of a cube is 300 pm. Its body diagonal would be– **519.6 pm**	**Karnataka-CET-2018**
The metals crystallise as a simple cube is – **Polonium**	**MHT CET-2018**
Zn converts from its melted state to its solid state, it has HCP structure, then the number of nearest atoms will be– **12**	**UPTU/UPSEE-2018**
A metal crystallizes with face centred cubic lattice. The edge of the unit cell is 408 pm. The diameter of the metal atom is– **288 pm**	**Assam CEE-2018**
The lattice point per unit cell in the figure  is– **4**	**CG PET -2018**
The limiting radius ratio for tetrahedral shape is– **0.225 to 0.414**	**COMEDK-2018**
A fcc crystal contains how many atoms in each unit cell– **4**	**HP CET-2018**
Crystal system of $CuSO_4.5H_2O$ is– **triclinic**	**JCECE - 2018**
If 'a' stands for the edge length of the cubic systems : simple cubic, body centred cubic and face centred cubic, then the ratio of radii of the spheres in these systems will be respectively,– $\frac{1}{2}a : \frac{\sqrt{3}}{4}a : \frac{1}{2\sqrt{2}}a$	**VITEEE-2017**
A metal crystallises in a face centred cubic structure. If the edge length of its unit cell is 'a', the closest approach between two atoms in metallic crystal will be– $\frac{a}{\sqrt{2}}$	**[JEE Main 2017]**
If ionic radius of Cs^+ and Cl^- are 1.69 Å and 1.81 Å respectively, the edge length of unit cell is:– **4.04 Å**	**Manipal-2017**
The contribution of particle at the edge centre to a particular unit cell is– $\frac{1}{4}$	**Karnataka-CET-2016**
In calcium fluoride having the fluorite structure, the coordination number for calcium ion (Ca^{2+}) and fluoride ion (F^-) are– **8 and 4**	**(NEET-II-2016)**
A unit cell with edge length $a \neq b \neq c$ and axial angles $\alpha = \beta = \gamma = 90°$ is called– **orthorhombic**	**J & K CET-(2015)**
The unit cell with crystallographic dimensions, $a \neq b \neq c$, $\alpha = \gamma = 90$ and $\beta \neq 90$ is– **monoclinic**	**Karnataka-CET-2015**

Search on TG: @apna_pdf

@apna_pdf

The number of CsCl units per unit cell of it is– **1**	**SRMJEEE – 2015**
Potassium dichromate belongs to crystal system of– **Triclinic**	**Kerala-CEE-2014**
The solids crystallises as a face centred cube– **Platinum**	**MHT CET-2014**
An ionic compound has a unit cell constituting of A ions at the corners of a cube and B ions on the centres of the faces of the cube. The empirical formula for the compound would be– **AB_3**	**SRMJEEE – 2014**
CsCl crystallises in body centered cubic lattice. If 'a' its edge length, then – **$r_{Cs^+} + r_{Cl^-} = \frac{\sqrt{3}}{2}a$**	**[JEE Main 2014]**
The crystal lattice of electrovalent compound is composed of– **oppositely charged ions**	**J & K CET-(2014)**
The existence of a substance in more than one solid modifications is known as– **Polymorphism**	**[AIIMS-2013]**
The number of carbon atoms per unit cell of diamond unit cell is– **8**	**(NEET-2013)**
Two ions A^+ and B^- have radii 104 and 200 pm respectively, in a cubic close packed crystal of compound AB. The co-ordination no. of A^+ is– **6**	**COMEDK-2012**
The crystal structure of solid Mn(II) oxide is– **NaCl structure**	**J & K CET-(2012)**
Silver iodide is used for producing artificial rain because AgI– **has crystal structure similar to ice**	**Karnataka-CET-2012**
The number of nearest neighbours around each particle in a face centred cubic unit cell is:– **12**	**MPPET - 2012**
The radius ratio of a substance is 0.32. The coordination number of the substance is– **4**	**COMEDK-2011**
Tetragonal crystal system has the unit cell dimensions– **$a = b \neq c, \alpha = \beta = \gamma = 90°$**	**VITEEE- 2011**
In zinc blende structure, the coordination number of the cation is– **4**	**J & K CET-(2011)**
The edge length of the unit cell and r be the radius of an atom then for FCC arrangement, the relation is– **$4r = \sqrt{2}\,a$**	**JIPMER-2010**
The number of Na^+ ions filling all octahedral voids in NaCl structure is– **13**	**CG PET- 2010**
The edge length of a face centered cubic cell of an ionic substance is 508 pm. If the radius of the cation is 110 pm, the radius of the anion is– **144 pm**	**[AIEEE 2010]**
The space lattice of graphite is– **hexagonal**	**[AIIMS-2009]**
Edge length of a cube is 400 pm, its body diagonal would be– **693 pm**	**JCECE - 2009**
In NaCl crystal each Cl^- ion is surrounded by– **6Na^+ ions**	**UPTU/UPSEE-2009**
Arrangement of Sulphide ions in Zinc blende is.....– **FCC**	**GUJCET-2008**
For AX ionic crystal to exist in BCC structure, the ratio of radii $\left(\frac{r_{cation}}{r_{anion}}\right)$ should be– **greater than 0.73**	**J & K CET-(2008)**
An ionic compound is expected to have tetrahedral structure if r_+/r_- lies in the range of– **0.225 to 0.414**	**KARNATAKA-CET, 2008**
The radius ratio in CsCl is 0.93. The expected lattice structure is– **body-centred cubic**	**UPTU/UPSEE-2008**
A cubic close packed (ccp) structure contains 'N' atoms. The tetrahedral and octahedral voids, respectively, will be– **2N and N**	AMU – 2007
The crystalline structure of NaCl is– **face centered cubic**	**J & K CET-(2007)**
AB is an ionic solid. The ionic radii of A^+ and B^- are r_c and r_a respectively. Lattice energy of AB is proportional to– **$\frac{1}{(r_c + r_a)}$**	**A.P.EAMCET-2006**
The rank of a face centred cube unit cell is– **4**	**AMU–2006**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

Interionic distance for CsCl crystal is–	$\frac{\sqrt{3}}{2}a$	**CG PET -2006**
In CsCl type of structure co-ordination of Cs^+ and Cl^- are :–	**8, 8**	**UPTU/UPSEE-2005**
Structure of NaCl crystal is–	**cubic**	**CG PET -2004**
Bravais lattices are of–	**14 types**	**CG PET -2004**
The coordination number of sodium Na_2O–	**4**	**[AIIMS-2003]**
The coordination number of body centred cube–	**8**	**UP CPMT-2003**
An AB_2 type structure is found in–	**CaF_2**	[AIIMS-2002]
Each unit cell of NaCl consists of 6 chlorine atoms and–	**6 Na atoms**	**J & K CET-(2000)**
The range of radius ratio (cationic to anionic) for an octahedral arrangement of ions in an ionic solid is–	**0.414 – 0.732**	**J & K CET-(1998)**
In CsCl structure, each Cs^+ ion is surrounded by–	**8 Cl^- ions**	**J & K CET-(1997)**
The intermetallic compound LiAg crystallizes in cubic lattice in both lithium and silver have coordination number of eight. The crystal class is–	**body-centred cube**	**(NEET-1997)**
In the fluorite structure, the coordination number of Ca^{2+} ion is–	**8**	**(NEET-1993)**
For orthorhombic system axial ratio are a≠b≠c and the axial angles are–	**$\alpha = \beta = \gamma = 90°$**	**NEET-(1991)**
Number of atoms in the unit cells of Na (BCC type crystal) and Mg (FCC type crystal) are, respectively–	**2, 4**	**JEE Main 2018**
It both frenkel and Schottky Defect is–	**AgBr**	**Assam CEE-2021** **JEE Main-08.01.2020-Shift-II** **JIPMER-2019** **GUJCET-2019** **J&K CET-2010**
Due to Frenkel defect, the density of ionic solids–	**does not change**	**BITSAT-2013** **CGPET-2012**
The flame colors of metal ions are due to–	**metal excess defect**	**CG PET- 2011** **Manipal-2016**
In a solid lattice, the cation has left a lattice site and is located at interstitial position, the lattice defect is–	**Frenkel defect**	**JCECE-2012** **J & K CET-(2005)**
Schottky defect in a crystal is observed, when–	**equal number of cations and anions are missing from the lattice**	**Karnataka-CET-2016** **AIPMT-1998**
An excess of potassium ions makes KCl crystal appear violet or lilac in colour because _____–	**some of the anionic vacancies are occupied by unpaired electron**	**AP- EAPCET- 07-09-2021, Shift-I**
The defect produced due to the presence of extra cations at interstitial sites is called_____.	**metal excess defect**	**AP EAMCET (Engg.) 17.09.2020, Shift-II**
When $CaCl_2$ is added to AgCl crystal, the defect introduced is–	**Schottky defect only**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
Schottky defect is shown by–	**ionic substances in the cation are of almost similar sizes**	**Kerala-CEE-2020**
F- centre is–	**anion vacancy occupied by unpaired electron**	**[AIIMS-26 May, 2018(M)]**
A type of defect observed in stoichiometric compounds in Schottky defect. Schottky defect occur mainly in ionic compounds where–	**positive and negative ions are of same sizes**	**J & K CET-(2017)**
The defect in any crystal lowers its density is–	**Schottky**	**UPTU/UPSEE-2016**
Ionic solids with Schottky defect may contain in their structure–	**equal number of cation and anion vacancies**	**WB-JEE-2016**

Search on TG: @apna_pdf

@apna_pdf

Schottky defect in crystals is observed when– **equal number of cations and anions are missing from the crystal lattice**	**COMEDK 2014**
When a cation leaves its normal position in the crystal and moves to some interstitial space, the defect in the crystal is known as– **Frenkel defect**	**J & K CET-(2013)**
Extrinsic semi-conduction is due to– **impurity in crystal**	**SRMJEEE – 2010**
In stoichiometric defect, the ratio of positive and negative ions as indicated by chemical formula of the compound– **remains same**	**UPTU/UPSEE-2010**
Schottky defects occurs mainly in electrovalent compounds where– **positive ions and negative ions are of same size**	**VITEEE- 2008**
The structure of ionic compound with Schottky defects has– **same number of cationic and anionic vacancies**	**CG PET -2007**
An ion leaves its regular site occupy a position in the space between the lattice sites is called– **Frenkel defect**	**VITEEE- 2007**
Schottky defect is observed in the crystal of– **NaCl**	**AP - EAMCET (Medical) - 2007**
Schottky defect in solids is due to– **a pair of cation and anion vacancies**	**VITEEE- 2006**
When electrons are trapped into the crystal in anion vacancy, the defect is known as:– **F-centres**	**JIPMER-2006**
The appearance of colour in solid alkali metal halides is generally due to– **F-centres**	**(NEET-2006)**
Frenkel and Schottky defects are– **crystal defects**	**JIPMER-2005**
Point defects are present in– **ionic solids**	**CG PET -2004**
Density of a crystal remains unchanged as a result of:– **Frenkel defect**	**Kerala-CEE-2004**
Schottky defects defines imperfection in the lattice structure of– **Solid**	[AIIMS-2002]
Ionic solids, with Schottky defects, contain in their structure– **equal number of cation and anion vacancies**	**(NEET-1994)**
In Bragg's equation $n\lambda = 2d\sin\theta$, n represents :– **Order of reflection**	**MPPET-2013**
Bragg's law is given by the equation– **$n\lambda = 2d \sin\theta$**	**VITEEE-2003**

Number of ATOMS in unit cell.

The percentage of free space in body. centred cubic unit cell is – **32%**	**NEET-2015, 2008** **J & K CET-(2014)** **JIPMER-2014**

Closed packed structure, Packing Efficiency

Total volume of atoms present in a face-centred cubic unit cell of a metal is (r is atomic radius)– $\frac{16}{3}\pi r^3$	**MHT-CET, 2016** **BITSAT-2009** **JIPMER-2008** **BCECE-2008** **JCECE-2007** **[AIEEE 2006]**
The fraction of total volume occupied by the atoms present in a simple cube is– $\frac{\pi}{6}$	**BITSAT-2011** **NEET - 2007**
The ratio of packing density in FCC, BCC, simple cubic and HCP, respectively is– **1.0 : 0.92 : 0.7 : 1.0**	**TS-EAMCET 09.08.2021, Shift-I**
The vacant space in body centered cubic (bcc) lattice unit cell is about– **32%**	**Assam CEE-2020**
An element has a body centered cubic (bcc) structure with a cell edge of 288 pm. The atomic radius is– $\frac{\sqrt{3}}{4} \times 288\text{pm}$	**(NEET-2020)**
The packing efficiency of arrangement in a body centred unit cell. is– **68.00%**	**GUJCET-2019**

TEAM SW

Search on TG: @apna_pdf

@apna_pdf

A solid AB has NaCl structure. If the radius of cation A^+ is 170 pm, then the maximum possible radius of the anion B^- is– **410.6 pm**	**JIPMER-2017**
The packing efficiency of simple cubic (sc), body centred cubic (bcc) and cubic close packing (ccp) lattices , the order is– **sc < bcc < ccp**	**TS-EAMCET-2016**
The non stoichiometric compound $Fe_{0.94}O$ is formed when x % of Fe^{2+} ions are replaced by as many $\frac{2}{3}Fe^{3+}$ ions, x is– **18**	**BITSAT-2016**
If AgI crystallises in zinc blende structure with I ions at lattice points the fractions of tetrahedral voids occupies by Ag^+ ions is– **50%**	**[AIIMS-2014]**
CsBr has BCC structure with edge length 4.3 p.m. The shortest inter-ionic distance between Cs^+ and Br^- in p.m. is– **3.72**	**Assam CEE-2014**
If a is the length of the side of a cube, the distance between the body-centred atom and one corner atom in the cube will be– $\frac{\sqrt{3}}{2}a$	**(NEET-2014)**
A metal crystallises with a face-centred cubic lattice. The edge of the unit cell is 408pm. The diameter of the metal atom is– **288pm**	**(NEET-2012)**
Atom A possesses higher values of packing fraction than atom B. The relative stabilities– **B is more stable than A**	**UP CPMT-2011**
Percentage of free space in cubic close packed structure and in body centred packed structure are respectively– **26% and 32%**	**[AIEEE 2010]**
A solid metal has ccp or fcc structure. The relation of side of cube (a) and radius of atom (r) will be– $a = 2\sqrt{2}\ r$	**CG PET -2009**
If a stands for the edge length of the cubic systems: simple cubic, body-centred cubic and face-centred cubic, then the ratio of radii of the spheres in these systems will be respectively– $\frac{1}{2}a : \frac{\sqrt{3}}{4}a : \frac{1}{2\sqrt{2}}a$	**(NEET-2008)**
The 8:8 type of packing is present in– **CsCl**	**VITEEE- 2007**
For an ionic crystal of the general formula AX and coordination number is 6, the value of radius ratio will be– **in between 0.73 and 0.41**	**CG PET -2006**
The percentage of unoccupied volume in simple cubic cell is– **47.60%**	**MHT CET-02.05.2019, SHIFT-II**
The number of tetrahedral voids per atom in a crystal lattice is– **2**	**AMU–2003**
If in a crystal lattice of a compound, each corner of a cube is enjoyed by Sodium, each edge of a cube has Oxygen and centre of cube is enjoyed by Tungsten (W), then ..... formula.– $NaWO_3$	**AMU-2012 SRM JEE-2012 GUJCET-2011**
A solid compound formed by elements X and Y crystallises in a cubic structure in the X atoms are at the corners of a cube and the Y atoms are at the face-centre. The formula of the compound is– XY_3	**CGPET-2007 (NEET-2004)**
The number of octahedral void (s) per atom present in a cubic close-packed structure is– **1**	**J & K CET-(2018) NEET-2012**
Atoms of element N form HCP lattice and those of the element M occupy 1/3rd of tetrahedral voids. The formula of the compound formed by the elements M and N is– M_2N_3	**GUJCET-2022 [AIIMS-27 May, 2018(E)]**
Element 'B' forms CCP structure and 'A' occupies half of the octahedral voids, while oxygen atoms occupy all the tetrahedral voids. The structure of bimetallic oxide is:– AB_2O_4	**BITSAT-2021 JEE MAIN-2019-8 April Shift-I**
In a close-packed body-centred cubic lattice of potassium, the relation between the atomic radius (r) and the edge-length (a) of the cube is– $r = \frac{\sqrt{3}}{4}a$	**WB-JEE-2017 J&K CET, 2015**
An alloy made up of A and B metals crystallizes in a lattice, where B atoms occupy the corners and A atoms occupy the face centers. The formula of the alloy– A_3B	**TS-EAMCET (Engg.), 06.08.2021**

Search on TG: @apna_pdf

@apna_pdf

In a mixed oxide of 'A' and 'B', 'A' occupies all the octahedral voids while 'B' occupies (2/3)rd the tetrahedral voids. The molecular formula of this oxide is _____.– **$A_3B_4O_3$**	**AP-EAMCET 25-08-2021 Shift - I**
A compound of formula A_2B_3 has the hcp lattice. The atom forms the hcp lattice and what fraction of tetrahedral voids is occupied by the other atoms– **hcp lattice-B, $\frac{1}{3}$ tetrahedral voids-A**	**[JEE Main 2019, 10 Jan Shift-II]**
In FCC, distance between nearest tetrahedral voids is:– **$\frac{a}{2}$**	AIIMS 26 May 2019 (Evening)
General formula of solid in zinc blende structure is– **AB**	**BITSAT-2019**
The number of tetrahedral and octahedral voids in CCP unit cell are respectively– **8, 4**	**TS EAMCET-2017**
If oxide ions are arranged in hcp and the aluminium ions occupy two thirds of octahedral voids. The formula of the compound is– **Al_2O_3**	**JIPMER-2016**
If same type of atoms are packed in hexagonal close packing and cubic close packing separately, then– **density of hcp will be equal to ccp**	**COMEDK-2015**
A crystalline solid has A^- ions at the corners and face centres whereas B^+ ions are at the body centre and edge centres of the unit cell. The simplest formula of the compound will be– **AB**	**COMEDK 2014**
The number of octahedral and tetrahedral holes respectively present in a hexagonal close packed (hcp) crystal of 'X' atoms are– **X, 2X**	**AP-EAMCET (Engg.) 2013**
A compound formed by elements A and B crystallizes in the cubic structure where A atoms are at the corners of a cube and B atoms are at the face centres. The formula of the compound is– **AB_3**	**BCECE-2012**
In a face-centred cubic lattice, atom A occupies the corner positions and atoms B occupies the face centred positions. If one atom of B is missing from one of the face centred points, the formula of the compound is– **A_2B_5**	**[AIEEE 2011]**
A solid compound contains X, Y and Z atoms in a cubic lattice with X atom occupying the corners. Y atoms in the body centered positions and Z atoms at the face center unit cell. The empirical formula of the compound is– **XYZ_3**	**Kerala-CEE-2008**
The coordination number in HCP is– **12**	**[AIIMS-2007]**
The Ca^{2+} and F^- are located in CaF_2 crystal, respectively at face centered cubic lattice points and in– **tetrahedral voids**	**[AIIMS-2006]**
The coordination number of the ions is the CsCl crystal lattice is– **8 : 8**	**A.P.EAMCET-1991**
An alloy of copper, silver, and gold is found to have copper atom constituting the CCP lattice. If silver atom occupy the edge centres and gold atom is present at body centred, the alloy has a formula– **Cu_4Ag_3Au**	**VITEEE-2015**

Imperfections in solids, Electrical Properties and magnetic properties.

p-type silicon is formed by adding a minute amount of an element with– **three valence electrons**	**COMEDK-2017**
Malleability and ductility of metals can be accounted due to– **the capacity of layers of metal ions to slide over the other**	**KARNATAKA-CET, 2008**
If a pentavalent impurity is mixed in the crystal-lattice of germanium then the semiconductor formed will be– **n- type semiconductor**	**CG PET -2007**
If was mix a pentavalent impurity in a crystal lattice of germanium, The type of semiconductor formation is– **n- type semiconductor**	**(NEET-1996)**
On doping Ge metal with a little of In or Ga, one gets– **p- type semiconductor**	**(NEET-1993)**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

7. Solutions

Expressing concentrations of solutions, and solubility:

- The volume of the solution is doubled, the molarity- **Becomes exactly half**
- 138 g ethyl alcohol is mixed with 72 g of water. the ratio of mole fraction of alcohol to water is– **3 : 4**
- The molarity of 0.2 N Na_2CO_3 solution is- **0.1 M**
- The normality of orthophosphoric acid having purity of 70% by weight and specific gravity 1.54 gm/mL is– **33 N**
- A solution that is described as 10% glucose in water by mass means – **10 g of glucose is dissolved in 90 g of water resulting in a 100 g solution**
- 171 g of cane sugar ($C_{12}H_{22}O_{11}$) is dissolved in 1 litre of water. The molarity of the solution is– **0.5 M**
- The law that indicates the relationship between solubility of a gas in liquid and pressure is– **Henry's law**
- That gases has the lowest value of Henry's law constant– **CO_2**
- The equations represents Henry's law is – **$p = K_H x$**
- Solubility of gases in liquids– **Increases with decrease in temperature**
- The gas mixture is used by the divers inside the sea is – **$O_2 + He$**
- The lowest vapour pressure is exerted by– **Mercury**
- Partial pressure of a solution component is directly proportional to its mole fraction. This is known as– **Raoult's law**
- The vapour pressure of two liquid is P and Q are 80 and 60 torr, respectively. The total vapour pressure of solution obtained by mixing 3 mole of P and 2 mole of Q would be– **75 torr**
- The system that forms maximum boiling azeotrope is– **Acetone - chloroform**
- A solution of acetone in ethanol– **Shows a positive deviation from Raoult's law**
- The solution will show a negative deviation from Raoult's law is – **Acetone and chloroform**
- A solution containing components A and B follows Raoult's law– **A – B attraction forces remains same as A – A and B – B**
- The conditions for an ideal solution that obeys Raoult's law over the entire range of concentration– **$\Delta H_{mix} = 0, \Delta V_{mix} = 0, P_{total} = p_A^0 x_A + P_B^0 x_B$**
- A solution of two liquids boils at a temperature more than the boiling point of either of them. Hence, the binary solution shows– **Negative deviation from Raoult's law**
- The depression in freezing point is directly proportional to- **molality of the solution**
- The colligative property is not represented by– **Optical activity**
- The osmotic pressure is expressed in the unit of– **atm**
- A solution has higher osmotic pressure than its standard solution term will be used for this solution is– **Hypertonic**
- The compounds chepeast for preparing an antifreeze solution for a car radiatior is – **CH_3OH**
- The unit of K_f is– **K Kg mol^{-1}**
- If α is the degree of dissociation of Na_2SO_4, the van,t Hoff factor (i) used for calculating the molecular mass is– **$1 + 2\alpha$**
- Van't Hoff factor more than unity indicats that the solute in solution is– **Dissociated**
- Van't Hoff factor of $Ca(NO_3)_2$ is– **Three**
- Benzoic acid is dissolved in benzene, van't Hoff factor will be– **0.5**
- The van't Hoff factor (i) for a compound that undergoes dissociation in one solvent and association in other solvent is respectively **–Greater than one and less than one**
- Van't Hoff factor of Hg_2Cl_2 in its aqueous solution will be (Hg_2Cl_2 is 80% ionized in the solution)– **2.6**
- A non-ideal solution was prepared by mixing 30 ml chloroform and 50 ml acetone. The volume of mixture will be– **< 80 mL**
- If M_{normal} is the normal molecular mass and α is the degree of ionization of $K_3[Fe(CN)_6]$, then the abnormal molecular mass of the complex is– **$M_{normal}(1+3\alpha)^{-1}$**
- For an ideal binary liquid solution with $p_A^0 > p_B^0$, the relation between X_A (mole fraction of A is liquid phase) and Y_A (mole fraction of A in vapour phase) is- $\frac{Y_A}{Y_B} > \frac{X_A}{X_B}$
- The van't Hoff factor (i) reamins unchanged, if– **aq. $ZnCl_2$ reacts with aq. NH_3**

Search on TG: @apna_pdf

@apna_pdf

- A solution is preparred by mixing 100 mL each of methanol (d = 0.791 g/mL) and ethanol (d = 0.998 g/mL). If M_1 is molarity of solution described as MeOH solute in EtOH solvent and M_2 is molarity of solution described as EtOH solute in MeOH solvent. Then– **$M_1 > M_2$**
- A mixture of two immiscible liquids at a constant pressure of 1 atm boils at a temperature– **Smaller than the normal boiling point of either of the liquid**

Vapour pressure of liquid solutions

- The vapour pressure of the solution of two liquids A(p^o = 0 mm) and B(p^o = 120 mm) is found to be 100 mm of Hg when x_A = 0.4. The result shows that– **Δ_{mix} H < 0**
- The units is useful in relating concentration of solution with its vapour pressure is – **Mole fraction**
- At equilibrium the rate of dissolution of a solid solute in a volatile liquid solvent is– **Equal to the rate of crystallisation**
- A beaker contains a solution of substance. A Precipitation of substance. A takes place when small amount of A is added to the solution The solution is– **Supersaturated**
- The maximum amount of a solid solute that can be dissolved in a specified amount of a given liquid solvent does not depend upon– **Pressure**
- Low concentration of oxygen in the blood and tissues of people living at high altitude is due to– **low atmospheric pressure**
- Considering the formation, breaking and strength of hydrogen bond, the mixtures will show a positive deviation from Raoult's law is – **Methanol and acetone**
- Colligative properties depend on– **the number of solute particles in solution**
- The unit of ebullioscopic constant is– **K kg mol^{-1} or K (molality)**
- An unripe mango placed in a concentrated salt solution to prepare pickle shrivels because– **It loses water due to osmosis**
- At a given temperature, osmotic pressure of a concentrated solution of a substance– **is higher than that of a dilute solution**
- The values of Van't Hoff factors for KC*l*, NaC*l* and K_2SO_4 respectively are– **2, 2 and 3**
- Value of Henry's constant K_H:– **increases with increase in temperatue**
- The value of Henry's constant, K_H is– **greater for gases with lower solubility**
- In isotonic solutions– **Osmotic pressure is same, solute is always the same solvent may be different**
- K_H value for Ar(g), CO_2 (g), HCHO (g) and CH_4 (g) are 40.39, 1.67, 1.83×10^{-5} and 0.413 respectively. the order of their increasing solubility is- **Ar < CO_2 < CH_4 < HCHO**
- Van't Hoff factor (i) is given by the expression–

$$i = \frac{\text{normal molar mass}}{\text{abnormal molar mass}}$$

$$i = \frac{\text{observed colligative property}}{\text{calculated colligative property}}$$

- Isotonic solutions must have the same– **Elevation in boiling point and Depression in freezing point**
- The binary mixtures will have same composition in liquid and vapour phase?– **Water-nitric acid**
- Isotonic solutions have same– **Osmotic pressure**
- The mixture that forms maximum boiling azeotrope **Water + Nitric acid**
- ..... is dependent on temperature– **Molarity**
- The concentration units, independent of temperature would be– **Molality**
- ..... gas is most soluble in water– **NH_3**

Ideal and non-ideal solution

- If solute and solvent interactions are more than solute-solute and solvent-solvent interaction then– **It is non-ideal solution with negative deviation**
- In liquid-gas equilibrium, the pressure of vapours above the liquid is constant at– **Constant pressure**
- A solution containing components A and B follows Raoult's law– **A-B attraction force remains same as A-A and B-B**
- An azeotropic solution of two liquids has a boiling point lower than either of the boiling points of the two liquids when it– **Shows positive deviation**

Colligative Properties of Determination of the molar mass

- Equimolar solution of non-electrolyte in the same solvent have– **Same boiling point and same freezing point**
- If van't Hoff factor, i = 1, then– **Neither dissociation nor association**
- When $CuSO_4$ is added to a solution of ammonia– **Freezing point is raised**
- When a saturated solution of KCl is heated it becomes– **Unsaturated**
- van't Hoff factor for acetic acid in aqueous medium at infinite dilution is– **2**
- If molality of the dilute solution is doubled, the value of molal depression constant (K_f) will be– **Unchanged**

Search on TG: @apna_pdf

@apna_pdf

- The van't Hoff factor (i) for a dilute aqueous solution of the strong electrolyte barium hydroxide– **3**
- During osmosis, flow of water through a semi-permeable membrane is– **From both sides of semi-permeable membrane with unequal flow rates**
- From the colligative properties of solution ..... is the best method for the determination of molecular weight of protein and polymers– **Osmotic pressure**
- Camphor is often used in molecular mass determination because– **It has very high cryoscopic constant**
- The highest temperature at which vapour pressure of any liquid can be measured is– **Boiling point of the liquid**
- ..... have highest vapour pressure– **Glucose**
- An aqueous solution is 1.00 molal in KI. which change will cause the vapour pressure of the solution to increase– **Addition of water**
- According to Raoult's law, the relative lowering of vapour pressure for a solution is equal to– **Mole faction of solvent**
- At higher altitude, the boiling point of water is lowered because– **Atmosphere pressure is low**
- When NaCl is added to aqueous solution of glucose– **Freezing point is lowered**
- An aqueous solution of sugar is taken in a beaker. A freezing point of solution– **Crystals of ice separated**
- ..... compounds can be used as antifreeze in automobile radiators– **Glycol**
- In the case of osmosis, solvent molecule move from solution having– **Higher concentration to lower concentration**
- In the phenomenon of osmosis through the semi-permeable membrane– **Solute molecules pass from solvent to solution**
- Homogeneous mixture of two or more than two components is called– **Solution**
- Example of gaseous solution is a– **Camphor in nitrogen gas, Chloroform mixed with nitrogen gas**
- In amalgam of mercury with sodium, solvent is– **Sodium**
- The law indicates the relationship between solubility of a gas in liquid and pressure is– **Henry's law**
- H_2S a toxic gas used in qualitative analysis. If solubility of H_2S in water at STP is 0.195 m, the value of K_H is– **282 bar**
- Positive deviation from Raoult's law is – **Acetone + Ethanol**
- Example of negative deviation from Raoult's law is **Acetone + Chloroform**
- The system that forms maximum boiling azeotrope is– **Acetone – Chloroform**
- The relative lowering in vapour pressure is proportional to the ratio of number of– **Solute molecules to the total number of molecules in solution**
- 2 g of sugar is added to one liter of water to give sugar solution. The effect of addition of sugar on the boiling point and freezing point of water is– **Boiling point increases and freezing point decreases**
- Sprinkling of salt helps in clearing the snow covered roads in hills. The phenomenon involved in the process is– **Depression in freezing point of snow**
- Equimolal solutions in the same solvent have– **Same elevation in boiling point and same depression in freezing point**
- The osmotic pressure of a solution can be increased by– **Increasing the number of solute molecules**
- People taking lot of salt experience puffiness or swelling of the body due to– **Water retention in tissue cells and intercellular spaces because of osmosis**
- The preservation of meat by salting and of fruits by adding sugar protects them from bacterial action because– **Due to osmosis bacteria lose water on salted meat or candied fruit and die**
- Sea water is desalinated to get fresh water, the methods is– **When pressure more than osmotic pressure is applied pure water is squeezed out of sea water by reverse osmosis**
- A plant cell shrinks when it is kept in a– **Hypertonic solution**
- For carrying reverse osmosis for desalination of water the material used for making semipermeable membrane is– **Cellulose acetate**
- The molecular mass determined by measuring colligative property in case of some solutes is abnormal– **Due to association or dissociation of solute molecules**
- If α is the degree of dissociation of Na_2SO_4, the van't Hoff's factor (i) used for calculating the molecular mass is– **1 + 2α**
- The highest freezing point at one atmosphere will have– **0.1 M sugar solution**
- The units that is useful in relating concentration of solution with its vapour pressure is – **Mole fraction**
- At equilibrium the rate of dissolution of a solid solute in a volatile liquid solvent is– **Equal to the rate of crystallisation**
- Maximum amount of a solid solute that can be dissolved in a specified amount of a given liquid solvent does not depend upon– **Pressure**

Search on TG: @apna_pdf

- Low concentration of oxygen in the blood and tissues of people living at high altitude is due to– **Low atmospheric pressure**
- Colligative properties depend on– **The number of solute particles in solution**
- The aqueous solutions should have the highest boiling point is– **1.0 M Na_2SO_4**
- At a given temperature, osmotic pressure of a concentrated solution of a substance– **Is higher than that at a dilute solution**
- The values of van't Hoff factors for KCl, NaCl and K_2SO_4, respectively, are– **2, 2 and 3**
- Value of Henry's constant K_H – **Increases with increase in temperature**
- The mixture which shows positive deviation from Raoult's law is– **Ethanol + acetone**
- The size of a raw mango shrinks to a much smaller size when kept in a concentrated salt solution. The processes can explain this– **Osmosis**
- The mixture that forms maximum boiling azeotrope is– **Water + nitric acid**

EXAM POINT

Expressing Concentration of Solutions and Solubility.

In one molal solution that contains 0.5 mole of a solute there is– **500 g of solvent**	**NEET-17.06.2022**
100 mL of 5% (w/v) solution of NaCl in water was prepared in 250 mL beaker. Albumin from the egg was poured into NaCl solution and stirred well. This resulted in a/an– **Lyophilic sol**	**JEE Main 29.07.2022, Shift-I**
The factor $\frac{\Delta T_f}{K_f}$ represents– **Molality**	**CG PET-22.05.2022**
The colligative properties can provide molar mass of proteins, polymers, and colloids with greater precision – **Osmotic pressure**	**Karnataka CET-17.06.2022, Shift-II**
The property of CO_2 makes it biologically and geo-chemically important– **Its low solubility in water**	**Karnataka CET-17.06.2022, Shift-II**
Molarity is– **the number of moles of solute present in 1 dm^3 volume of solution**	**MHT CET-2018, 2015**
In qualitative analysis, NH_4Cl is added before NH_4OH– **to decrease [OH^-] concentration**	**Manipal-2020**
Two open beakers one containing a solvent and the other containing a mixture of that solvent with a non-volatile solute are together sealed in a container. Over time– **The volume of the solution increases and the volume of the solvent decreases**	**[JEE Main 2020, 7 Jan Shift-I]**
The mole fraction of gas in the solution is– **Proportional to the partial pressure of the gas over the solution**	**Assam CEE-2019**
The attraction between A–B is more than that of A–A and B–B, the solution will show– **negative deviation from Raoult's law**	**Manipal-2018**
Milk is an emulsion in– **milk fat is dispersed in water**	**UPTU/UPSEE-2016**
A one molal solution of sodium chloride in water has the same boiling point as– **1 m solution of magnesium sulphate**	**COMEDK-2014**
The concentration is expressed as the number of moles of solute per kilogram of the solvent, it is known as– **molality**	**COMEDK-2014**
At equilibrium the rate of dissolution of a solid solute in a volatile liquid solvent is– **equal to the rate of crytallisation**	**JIPMER-2013**
The experimentally determined molar mass of a non-volatile solute, $BaCl_2$ in water by Cottrell's method, is– **less than the calculated molar mass**	**AP-EAMCET (Engg.)-2012**
In mode of expression of concentration of a solution remains independent of temperature– **Molality**	**MPPET-2012**
The concentration factors is affected by change in temperature– **Molarity**	**MHT CET-2008**
The concentration of H_2O_2 solution of '10 volume' is– **3%**	**JCECE-2008**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

Molarity is expressed as– **Moles/litre**	**MPPET-2008**
One part of solute in one million parts of solvent is expressed as– **ppm**	**J & K CET-2007**
On mixing ethyl acetate with aqueous sodium chloride, the composition of the resultant solution is– **$CH_3COOC_2H_5$ + NaCl**	**AIEEE-2007**
Disperse phase and dispersion medium in butter are respectively– **liquid and solid**	**AP-EAMCET (Medical) - 2007**
CH_4(g) respectively are 40.39,1.67, 1.83×10^{-5} and 0.413. then identify the correct increasing order of their solubility's.– **$Ar < CO_2 < CH_4 < HCHO$**	**AP EAPCET 20.08.2021 Shift-I Kerala-CEE-29.08.2021**
AgCl is soluble in NH_4OH. The solubility is due to the formation of– **$[Ag(NH_3)_2]^+$**	**JCECE - 2019**
Out of BeF_2, MgF_2, CaF_2, SrF_2 which has maximum solubility:– **BeF_2**	**AIIMS 25 May 2019 (Evening)**
Normal solution is– **one liter containing one equivalent**	**UP CPMT-2005**

Vapour Pressure of liquid solutions

Henry's law is valid for– **O_2 dissolution in water**	**TS-EAMCET-18.07.2022, Shift-II**
For dilute solutions, Raoult's law states that– **Relative lowering of vapour pressure of the solvent is equal to the mole fraction of the solute**	**JCECE - 2014 J & K CET-(2010),(1999)**
The relative lowering of vapour pressure of aqueous solution containing non-volatile solute is 0.0125. The molality of the solution is– **0.70**	**Kerala-CEE-2008, 2007**
Value of Henry's constant K_H _____.– **increases with increase in temperature**	**GUJCET-2022**
A set of solutions is prepared using 180g of water as a solvent and 10 g of different non-volatile solutes and C. The relative lowering of vapour pressure in the presence of these solutes are in the order [Given, molar mass of A = 100g mol^{-1}: B = 200g mol^{-1} : C = 10,000g mol^{-1}]– **A > B > C**	**[JEE Main 2020, 6 Sep Shift-II]**
In comparison to a 0.01 M solution of glucose, the depression in freezing point of a 0.01M $MgC\ell_2$ solution is ..... (Molecular weight of $MgC\ell_2$=95, molecular weight of glucose = 180).– **about three times**	**AP EAMCET (Engg.) 21.09.2020, Shift-II**
'K' is Henry's constant and has the unit– **mol dm^{-3} atm^{-1}**	**MHT CET-02.05.2019, SHIFT-III**
The elevation in boiling point of 0.25 molal aqueous solution of a substance is (K_b = 0.52 K kg mol^{-1})– **0.13 K**	**MHT CET-03.05.2019, SHIFT-I**
Relative lowering of vapour pressure of a dilute solution of glucose dissolved in 1 kg of water is 0.002. The molality of the solution is– **0.111**	**Karnataka-CET-2019**
Solution 'A' contains acetone dissolved in chloroform and solution 'B' contains acetone dissolved in carbon disulphide. The type of deviations from Raoult's law shown by solution A and B, respectively are– **negative and positive**	**Karnataka-CET-2019**
A solution of two liquids boils at a temperature more than the boiling point of either of them. Hence, the binary solution shows– **negative deviation from Raoult's law**	**COMEDK-2019, KCET-2011**
Molal depression constant- $\frac{R \times M_1 \times T_f^2}{1000 \times \Delta_f H}$	**JCECE - 2018**
What happens on increasing pressure at constant temperature– **Solubility of gas increases in liquid.**	**[AIIMS-26 May, 2018 (M)]**
If x_1 and x_2 represent the mole fraction of a component A in the vapour phase and liquid mixture respectively and p_A^o and p_B^o represent vapour pressure of pure A and B, then total of vapour pressure of liquid mixture is– $\frac{P_A^o x_2}{x_1}$	**AMU-2018**

Search on TG: @apna_pdf

@apna_pdf

If P^o and P are the vapour pressure of the pure solvent and solution and n_1 and n_2 are the moles of solute and solvent respectively in the solution then the correct relation between P and P^o is– $P = P^o\left[\frac{n_2}{n_1+n_2}\right]$	**WB-JEE-2016**
For a non–volatile solute,– **Vapour pressure of solute is zero**	**UPTU/UPSEE-2016**
Partial vapour pressure of a solution component is directly proportional to its mole fraction. This statement is known as– **Raoult's law**	**COMEDK-2016**
If M is molecular weight of solvent, k_b is molal elevation constant, T_b is its boiling point, p^o is its vapour pressure at temperature T and P_s is vapour pressure of its solution having a non–volatile solute at T K, then– $\frac{P^o - P_s}{P^o} = \frac{\Delta T_b}{K_b} \times \frac{M}{1000}$	**UPTU/UPSEE-2014**
A pressure cooker reduces cooking time for food because– **boiling point of water involved in cooking is increased**	**SRMJEEE-2014, AIEEE-2003**
Henry's law constant value for O_2 in water is– **46.82**	**J & K CET-(2014)**
The aqueous solution that has the lowest vapour pressure at a given temperature is– **0.1 molal sodium phosphate**	**UP CPMT-2013**
P_A and P_B are the vapour pressures of pure liquid components, A and B, respectively of an ideal binary solution. If x_A represents the mole fraction of component A, the total pressure of the solution will be– $P_B + x_A(P_A - P_B)$	**(AIPMT -2012)**
The dissolution of a gas in a liquid is governed by– **Henry's law**	**J & K CET-(2012)**
When a solution containing non-volatile solute is diluted with water– **its vapour pressure increases**	**J & K CET-(2011)**
Ratio of loss in solvent to gain in $CaCl_2$ tube is– $\frac{p° - p}{p°}$	**MHT CET-2010**
The activity in microcurie – 3.2×10^4	**SCRA-2010**
In winter season specially in cold countries, ethylene glycol is added to water in the radiators of car. It results in– **lowering the freezing point of water**	**SCRA-2010**
The relative lowering of vapour pressure is equal to– **Ratio of the number of solute molecules to the total number of molecules in solution**	**AP EAMCET-2008**
A non-volatile solute (A) is dissolved in a volatile solvent (B). The vapour pressure of the resultant solution is P_s. The vapour pressure of pure solvent is P_B^o, If X_B is the mole fraction of the solvent, which of the following is correct – $P_s = X_B \cdot P_B^o$	**AP-EAMCET-2008**
Fractional distillation is a process by which the separation of different fractions from mixture of solution is carried by making us of the following property of the fractions– **boiling point**	**J & K CET-(2007)**

Ideal and non-ideal solutions

The correct order of solubility of Na_2S, CuS and ZnS in aqueous medium– **Na_2S > ZnS > CuS**	**[BITSAT – 2014] NEET-2013**
The water having more dissolved O_2 is– **Water at 4°C**	**[JEE Main 2021, 22 July Shift-II]**
A solution that obeys Raoult's law is called.– **Ideal solution**	**AP EAMCET-2008**

Colligative Properties and Determination of Molar Mass

During the depression in freezing point experiment, an equilibrium is established between the molecules of– **liquid solvent and solid solvent**	**AP EAMCET (Engg.)-2009 VITEEE- 2009**
Function of potassium ethyl xanthate in froth floatation process is to make the ore– **hydrophobic**	**Karnataka-CET-2020**

JEAM SPM
Search on TG: @apna_pdf
@apna_pdf

When the pure solvent diffuses out of the solution through the semi-permeable membrane then the process is called- **reverse osmosis**	**Karnataka-CET-2017**
The freezing point of equimolal solution will be highest for– **D-fructose**	**Kerala-CEE-2017**
Raoult's law becomes a special case of Henry's law when– $K_H = P_1^o$	**BITSAT-2017**
Cryolite is– Na_3AlF_6 **and is used in the electrolysis of alumina for lowering the melting point and increasing the conductivity of alumina**	**Karnataka-CET-2015**
Fog is colloidal solution of– **Liquid particles dispersed in a gas**	**JCECE-2015**
If a homogeneous colloid placed in dark is observed in the direction of light, it appears clear and if it is observed from a direction at right angles to the direction of light beam, it appears perfectly dark. This is known as– **Tyndall effect**	**J & K CET-2015**
Colloidal solutions of gold, prepared by different methods are of different colours because of– **Different diameters of colloidal gold particles**	**JCECE-2012**
The size of colloidal particles is in between– 10^{-5}-10^{-7} **cm**	**JCECE-2010**
Gold number indicates– **protective action of lyophlic colloid**	**AMU-2010**
Maximum depression in freezing point is caused by– **sodium sulphate**	**MHT CET-2009**
Abnormal colligative properties are observed only when the dissolved non-volatile solute in a given dilute solution– **Associates or dissociates**	**J & K CET-2008**
Lyophilic sols are more stable than lyophobic sols because the particles :– **are negatively charged**	**Kerala-CEE-2005**
Equimolar solution in the same solvent have– **Same boiling point and same freezing point**	**AIEEE-2005**
A pressure cooker reduces cooking time for food because– **Boiling point of water involved in cooking is increased**	**Rajasthan PMT-2008**
The effect of external pressure on the osmotic pressure (OP) of a solution– **OP remained nearly same with increase/ decrease of external pressure**	**TS-EAMCET-19.07.2022, Shift-I**
During osmosis, flow of water through a semipermeable membrane is– **From solution having lower concentration only**	**CG PET -2007, (AIPMT - 2006)**
The size of a raw mango shrinks to a much smaller size when kept in a concentrated salt solution. It can express– **Osmosis**	**[JEE Main 2020, 2 Sep Shift-II]**
Sea water is converted into fresh water based on the phenomenon of– **reverse osmosis**	**COMEDK 2018**
Osmotic pressure of the solution can be increased by– **increasing the temperature of the solution**	**Karnataka-CET-2016**
The osmotic pressure of equimolar solutions of Urea, $BaCl_2$ and $AlCl_3$ will be in order of– $AlCl_3 > BaCl_2 >$ **Urea**	**BCECE-2016**
If M, W and V represent molar mass of solute, then mass of solute and volume of solution in litres respectively, which among following equations is true?– $\Pi = \frac{TWR}{VM}$	**MHT CET-2015**
The most suitable property for molecular weight determination of polymers is–**Osr**	**MPPET - 2012**
The highest osmotic pressure corresponds to the following solution– **M/10** $BaCl_2$	**AMU-2012**
Desalination of sea water can be done by– **reverse osmosis**	**J & K CET-(2012)**
The order of osmotic pressure of three equimolar aqueous solutions of $CaCl_2$, NaCl and $C_6H_{12}O_6$ (glucose) is– $CaCl_2 > NaCl > C_6H_{12}O_6$	**UP CPMT-2012**
The relationship between the values of osmotic pressure of 0.1M solutions of $KNO_3(p_1)$ and $CH_3COOH(p_2)$ is– $p_1 > p_2$	**BCECE-2010**
For getting accurate value of molar mass of a solute by osmotic pressure measurement– **the solute must be non-volatile.**	**J & K CET-(2010)**

Search on TG: @apna_pdf

@apna_pdf

After removing the hard shell of an egg by dissolving in dil. HCl, a semipermeable membrane is visible. If such an egg is kept in a saturated solution of common salt, the size of the egg will– **shrink**	**AP - EAMCET(MEDICAL) - 2009**
An aqueous solution of hydrochloric acid– **shows negative deviation from Raoult's law**	**[AIIMS-2009]**
Osmotic pressure of a solution at a given temperature– **increases with concentration**	**UPTU/UPSEE-2008**
Two solutions of KNO_3 and CH_3COOH are prepared separately. Molarity of both is 0.1 M and osmotic pressures are P_1 and P_2 respectively. The correct relationship between the osmotic pressures is– **$P_1 > P_2$**	**SRMJEEE – 2007**
The osmotic pressure is expressed in units of– **atmosphere**	**J & K CET-(2007)**
Two solutions with equal osmotic pressure are– **isotonic solutions**	**AMU–2006**
Solutions A, B, C and D are 0.1 M glucose, 0.05 M NaCl, 0.05 M $BaCl_2$ and 0.1 M $AlCl_3$ respectively. Which one of the following pairs is isotonic?– **A and B**	**JIPMER-2017 SRMJEEE – 2016 CG PET- 2011 MHT CET–2008**
Isotonic solutions have same– **osmotic pressure**	**COMEDK 2017 JCECE - 2007**
Concentrated hydrochloric acid when kept in open air sometime produces a cloud of white fumes. The explanation for it is that– **oxygen in air reacts with the emitted HCl gas to form a cloud of chlorine gas**	**BCECE-2014**
Sodium hydride when dissolved in water produces– **Basic solution**	**MPPET-2013**
Pure water can be obtained from sea water by– **reverse osmosis**	**(AIPMT -2011)**
A 6% solution of urea is isotonic with– **1 M solution of glucose**	**Karnataka-CET, 2009**

Abnormal molar mass.

A colloidal solution is subjected to an electric field than colloidal particles more towards anode. The amount of electrolytes of $BaCl_2$, $AlCl_3$ and NaCl required to coagulate the given colloid is in the order– **$AlCl_3 > BaCl_2 > NaCl$**	**Kerala-CEE-29.08.2021**
The relation between elevation of boiling point and molar mass of solute is– $M_2 = \frac{k_b.w_2}{\Delta T_b.w_1}$	**MHT CET-2018**
Molal solution means 1 mole of solute present in:– **1 L of solution**	**BCECE-2005**
If molality of the dilute solution is doubled, the value of molal depression constant (K_f) will be– **unchanged**	**(NEET-2017)**
The formation of association of colloidal particles by addition of electrolyte to form as insoluble precipitate is called_____.– **Coagulation**	**GUJCET-2019**
Bleeding due to a cut can be stopped by applying ferric chloride solution in the laboratory. This is due to– **coagulation of negatively charged blood particles by Fe^{3+} ions.**	**JIPMER-2018**
Ferric chloride is used to stop bleeding in cuts because– **Fe^{3+} coagulated blood which is negatively charged solution**	**UPTU/UPSEE-2018**
The process which is responsible for the formation of delta at a place where rivers meets the sea is– **coagulation**	**Karnataka-CET-2017**
Gold sol can be prepared by– **reduction of gold (III) chloride with formalin solution**	**Kerala-CEE-2014**
The gold numbers of A, B, C and D are 0.04, 0.0002, 10 and 25 respectively. The protective powers of A, B, C, and D are in the order– **B > A > C > D**	**AMU-2011**
Coagulation is not done by– **peptisation**	**UPTU/UPSEE-2010**
The no. of positively and negatively charged sols respectively in the following are TiO_2, blood, CdS, Cu, Ag, Clay, SiO_2, Fe_2O_3– **4, 4**	**AP-EAMCET-07.07.2022, Shift-II**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

8. Electrochemistry

Electrochemical Cell

- In a Daniell cell– **The chemical energy liberated during the redox reaction is converted to electrical energy**
- The electro-chemical cell stops working after some time because– **Electrode potentials of both electrodes become equal**
- A cell that converts electrical energy into chemical energy– **Electrolytic cell**
- $\Lambda^{o}_{m\,(NH_4OH)}$ is equal to–

$$\Lambda^{o}_{m\,(NH_4Cl)} + \Lambda^{o}_{m(NaOH)} - \Lambda^{o}_{m(NaCl)}$$

- The emf of a galvanic cell, with electrode potential of $Zn^{2+} = -0.76$ V and that of $Cu^{2+} = 0.34$ V, is– **1.1 V**
- For cell reaction, $Zn + Cu^{2+} \rightarrow Zn^{2+} \rightarrow Cu$, cell representation is– **$Zn/Zn^{2+} \,||\, Cu^{2+}/Cu$**
- In a galvanic cell, the reactions taking place in the anodic half cell and the cathodic half cell will be– **Oxidation and reduction**
- A potential difference developed between the electrode and the electrolyte is known as– **Electrode potential**
- The relation between standard reduction potential of a cell and equilibrium constant is shown by–

$$E^{o}_{cell} = \frac{n}{0.059} \log K_c$$

- For a certain redox reaction, E^0 is positive. This means that– **$\Delta G°$ is negative, $K_{eq.}$ is greater than 1**
- The oxidation potential of hydrogen half-cell will be negative if– **$p(H_2) = 1$ atm and $[H^+] = 2M$, $p(H_2) = 0.2$ atm and $[H^+] = 1M$**
- During electrochemical process– **Gibbs free energy decreases**
- Alkali metals have high oxidation potential, hence, they behave as good– **Reducing agents**
- Zn gives H_2 gas with H_2SO_4 and HCl but not with HNO_3 because– **NO_3^- is reduced in preference to hydronium ion**
- Emf of hydrogen electrode in terms of pH is : [at 1 atm presure]– **$E_{H_2} = -0.0591pH$**
- Fluorine is the best oxidising agent because it has– **Highest reduction potential**
- The metal will not reduce H_2O– **Cu**
- Arrange in the order of their decreasing electrode potentials: Mg, K, Ba, Ca– **Mg > Ca > Ba > K**
- Zn metal is added to $CuSO_4$ solution, Cu is precipitated. It is due to– **Reduction of Cu^{2+}**
- NaCl, $MgCl_2$ and $CaSO_4$ are known as– **1-1, 2-1, 2-2 types electolyte respectively**
- Limiting molar conductivity of NaBr is– **Λ^{o}_{m} NaBr = Λ^{o}_{m} NaCl + Λ^{o}_{m} KBr – Λ^{o}_{m} KCl**
- Molar conductivity of NH_4OH can be calculated by the equation– $\Lambda^{o}_{NH_4OH} = \frac{\Lambda^{o}_{Ba(OH)_2} + 2\Lambda^{o}_{NH_4Cl} - \Lambda^{o}_{BaCl_2}}{2}$
- Water is added to an aqueous solution of an electrolyte, than- **Conductivity decreases**
- The specific conductance (κ) of an electrolyte of 0.1 N concentration is related to equivalent conductance Λ by the formula– **$A = 10000\,\kappa$**
- Pure water does not conduct electricity because it is– **Almost unionised**
- In aqueous solution, strong electrolytes ionised and yield– **Ions**
- A poor conductor of electricity is– **C_2H_5OH**
- Conductivity of a solution is directly propotional to– **Number of ions**
- The degree of dissociation of an electrolyte does not depend on– **Catalytic action**
- Conductivity is represented by– **κ**
- The SI unit of conductance is – **Siemens**
- NaCl(Solid) is not a conductor of - **Electricity**
- Concentration approaches zero, the molar conductivity is known as– **Limiting molar conductivity**
- Electrolytic conduction differs from metallic conduction. In case of metallic conduction– **The resistance increases with increasing temperature**

Search on TG: @apna_pdf

@apna_pdf

Galvanic Cell

- A galvanic cell has electrical potential of 1.1V. If an opposing potential of 1.1V is applied to this cell, ... will happen to the cell reaction and current flowing through the cell– **The reaction stops and no current flows through the cell**
- The cell reaction of the galvanic cell $Cu_{(s)}\left|Cu^{2+}_{(aq)}\right\|Hg^{2+}_{(aq)}\left|Hg_{(l)}\right.$ is – **$Cu + Hg^{2+} \rightarrow Cu^{2+} Hg$**
- In the galvanic cell– **Cathode is +ve terminal**
- The overall reaction of a hydrogen – oxygen fuel cell is– **$2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$**
- Leclanche cell is an example of- **Primary battery**
- Hydrogen-oxygen fuel cell are used in space-craft to supply– **Power and Water**
- During the electrolysis of aqueous solution of copper sulphate by using Pt electrodes is - **Copper will deposit at cathode, Oxygen will be released at anode**
- Total charge required for the oxidation of two moles Mn_3O_4 into MnO_4^{2-} in presence of alkaline medium is– **20 F**
- The electromotive force for the cell $Cu(s)/Cu^{2+}(0.01\ M) \| Cu^{2+}(0.04\ M) | Cu(s)$ is– $-\frac{RT}{F}\ln(0.5)$
- Fused NaCl has less electrical conductance than NaCl in the aqueous solution. This is due to– **Na^+, Cl^- ions do not move freely in the fused salt**
- In electrolysis of dil. H_2SO_4 using platinum electrodes– **H_2 is evolved at cathode**
- The standard electrode potential of copper electrode is – **$Pt(s)|H_2(g, 1\ bar)|H^+(aq, 1M)||Cu^{2+}(aq., 1M)|Cu$**
- The difference between the electrode potentials of two electrodes when no current is drawn through the cell is called– **Cell emf**
- An electrochemical cell can behave like a electrolytic cell – **$E_{ext} > E_{cell}$**
- The cell constant of a conductivity cell– **Remains constant for a cell**
- In the electrolysis of aqueous sodium chloride solution, the half cell reaction will occur at anode is – **$Cl^-(aq) \rightarrow \frac{1}{2}Cl_2(g) + e;\ E^-_{cell} = 1.36\ V$**
- The positive value of the standard electrode potential of Cu^{2+}/Cu indicates that– **This redox couple is a stronger oxidising agent than H^+/H_2, Cu cannot displace H_2 from acid**
- For the given cell, $|Mg|Mg^{2+}||Cu^{2+}|Cu$:– **Cu is cathode, The cell reaction is $Mg + Cu^{2+} \rightarrow Mg^{2+} + Cu$**
- Conductivity of an electrolytic solution depends on– **Nature of electrolyte, Concentration of electrolyte**
- During the electrolysis of aqueous solution of $CuSO_4$ by using platinum electrodes– **Copper will deposit at cathode, Oxygen will be released at anode**
- Conductivity κ, is equal to– $\frac{1}{R}\frac{l}{A}$
- Molar conductivity of ionic solution depends on– **Temperature**

Concentration of electrolytes in solution

- On electrolysis of dil sulphuric acid using Platinum (Pt) electrode, the product obtained at anode will be **Oxygen gas**
- The number of Faradays (F) required to produce 20 g of calcium from molten $CaCl_2$ (Atomic mass of Ca = 40 g mol^{-1}) is– **1**
- In a typical fuel cell, the reactants (R) and product (P) are- **R = $H_{2(g)}$, $O_{2(g)}$; P = $H_2O_{(\ell)}$**
- The molar conductivity of strong electrolyte– **Increases on dilution slightly**
- The conduction of electricity through the electrolyte solution is due to– **Movement of ions of electrolyte**
- Equivalent conductance of weak electrolyte increases on dilution because of– **Increases in degree of ionisation of the substance**
- As the dilution of an electrolyte increases– **Specific conductance decreases**
- The ionic mobility of alkali metal ions in aqueous solution is maximum for– **Rb^+**
- A strong electrolyte is– **$Ca(NO_3)_2$**
- Aqueous solution of ..... compounds is the best conductor of electric current– **Hydrochloric acid, HCl**
- An increase in equivalent conductance of a strong electrolyte with dilution is mainly due to– **Increase in ionic mobility of ions**

Electrolysis, and electrolytic cell

- While charging the lead storage battery– **$PbSO_4$ anode is reduced to Pb**
- The quantity of charge required to obtain one mole of aluminium from Al_2O_3 is– **3 F**
- The electrochemical cell stops working after sometime because– **Electrode potential of both the electrodes equalize**
- When dil. HNO_3 is electrolysed– **O_2 gas is formed at anode**
- The Coulombic charge on one mole electron is– **96500 C**

Search on TG: @apna_pdf
@apna_pdf

Batteries, Fuel cell Corrosion of metals

- Iron can be protected by coating with zinc or tin. If coating is broken– **Iron will corrode faster if coated with tin**
- Zinc is used to protect iron from rusting is because– **E^{o}_{ox} of Zn is greater than that of Fe**
- When lead storages battery discharges– **H_2SO_4 is consumed**
- The iron is rusted, it is– **Oxidised**
- Chemical formula of rust is– **$Fe_2O_3.xH_2O$**
- The reaction taking place in nickel-cadmium battery can be represented by- **$Cd + NiO_2 + 2H_2O \rightarrow Cd(OH)_2 + Ni(OH)_2$**
- Purpose of hydrogen-oxygen fuel cell is to– **Create potential difference**
- Fluoride is the best oxidising agent because it has– **Produce high purity water**
- $Ag^{+2} + H_2O + 2e^- \longrightarrow 2Ag + 2OH$ In the above chemical reaction– **Silver is reduced**
- In ..... the energy of combustion of the reaction is directly converted into electricity– **Fuel cell**
- Corrosion is basically– **Electrochemical phenomenon**
- The equilibrium constant for a feasible cell reaction– **–1**
- The EMF of a chemical cell is positive when free energy change of reaction– **< 0**
- Saturated solution of KNO_3 is used to make salt bridge because– **Velocity of K^+ and NO_3^- are nearly same**
- The main factors which affect corrosion are– **Position of metal in electrochemical series, Presence of CO_2 in water, Presence of impurities in metals**
- In lead storage battery, the anode reaction is– **$Pb + H_2SO_4 \rightarrow PbSO_4 + 2H^- + 2e^-$**
- In SHE, the pH of the acid solution should be– **0**
- E.M.F. of $Ni(s)|Ni^{2+}(aq) \parallel Cu^{2+}(aq)/Cu(s)$ cell can be increased by– **Adding dimethyl glyoxime into the left half-cell**
- The emf of the cell, $Zn|Zn^{2+}|Ag^+|Ag$ is independent of– **The volume of Zn^{2+} and Ag^+ solution**
- A device that converts energy of combustion of fuels like hydrogen and methane, directly into electrical energy is known as– **Fuel cell**
- To protect iron against corrosion, the most durable metal plating on it, is– **Zinc plating**
- Cell reaction is spontaneous when– **ΔG^o is negative**
- The most convenient method is protect the bottom of ship made of iron is **Connecting it with Mg block**
- The reactions is possible at anode– **$2Cr^{3+} + 7H_2O \rightarrow Cr_2O_7^{2-} + 14H^+$**
- In the cell, $Zn\left|Zn^{2+}\right\|\left|Cu^{2+}\right|Cu$, the negative terminal is– **Zn**
- A standard hydrogen electrode has a zero potential because– **The electrode potential is assumed to be zero**
- The correct order in metals displace each other from the salt solution of their salts– **Mg, Al, Zn, Fe, Cu**
- Zn gives hydrogen with H_2SO_4 and HCl but not with HNO_3 because– **NO_3^- is reduced in preference to H^+ ion**
- Fluorine is the best oxidising agent because it has– **Highest reduction potential**
- At 25 ^{0}C, Nernst equation is– $$E_{cell} = E^0_{cell} - \frac{0.0591}{n}\log\frac{[ion]_{RHS}}{[ion]_{LHS}}$$
- The SI unit of conductivity is– **$S\ m^{-1}$**
- When water is added to an aqueous solution of an electrolyte, the change in specific conductivity of the electrolyte is– **Conductivity decreases**
- Conductance is a– **Inverse of resistance**
- All substances that conduct electricity in aqueous solutions are called– **Electrolytes**
- In electrolysis of dilute H_2SO_4, the liberated at cathode is– **H_2**
- When an aqueous solution of $AgNO_3$ is electrolysed between platinum electrodes, the substances liberated at anode and cathode are– **Silver is deposited at cathode and O_2 is liberated at anode**
- When a lead storage battery is discharged– **Lead sulphate is formed**
- The reaction is taking place in nickel – cadmium battery can be represented by of the equation– **$Cd + NiO_2 + 2H_2O \rightarrow Cd(OH)_2 + Ni(OH)_2$**
- The overall reaction of a hydrogen-oxygen fuel cell is– **$2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(l)}$**
- The difference between the electrode potentials of two electrodes when no current is drawn through the cell is called– **cell emf**
- An electrochemical cell can behave like an electrolytic cell when– **$E_{ext} > E_{cell}$**
- The quantity of charge required to obtain one mole of aluminium from Al_2O_3 is– **3 F**
- The cell constant of a conductivity cell– **Remains constant for a cell**
- While charging the lead storage battery– **$PbSO_4$ anode is reduced to Pb**
- On electrolysis dil. sulphuric acid using platinum (Pt) electrode, the product obtained at anode will be– **Oxygen gas**
- Compound A used as a strong oxidizing agent is amphoteric in nature. It is the part of lead storage batteries. Compound A is– **PbO_2**
- Kohlrausch's law is applicable– **at infinite dilution**

Search on TG: @apna_pdf

@apna_pdf

EXAM POINT

Electrochemical cells

In fuel cells ____ are used as catalysts– **Platinum - Palladium**	**Karnataka CET-17.06.2022, Shift-II**
Half-life of a reaction is found to be inversely proportional to the fifth power is initial concentration, the order of reaction is– **6**	**Karnataka CET-17.06.2022, Shift-II**
During the electrolysis of copper sulphate aqueous solution using copper electrode, the reaction taking place at the cathode is– **Cu^{2+} (aq) + $2e^- \rightarrow$ Cu(s)**	**AP-EAMCET (Engg.)-2013 AP-EAMCET (Medical)-2001**
For cell reaction $Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$ cell representation is :– $Zn\|Zn^{2+}\|\|Cu^{2+}\|Cu$	**BCECE-2008, 2005**
The standard electrode potential of three metals X, Y and Z are – 1.2 V, + 0.5 and – 3.0 V respectively. The reducing power of these metals will be– **Z > X > Y**	**JIPMER-2014 JCECE - 2012**
The symbolic representation for following cell reaction, $Mg_{(s)} + Cl_{2(g)} \rightarrow Mg^{2+}_{(aq)} + 2Cl^-_{(aq)}$ **$Mg\|Mg^{2+}_{(aq)}\,(1M)\|Cl^-_{(aq)}\,(1M)\|Cl_{2(g)}\,(1bar)\|Pt$**	**GUJCET-2021**
The element with highest standard reduction potential (in Volt) [$M^{2+} \rightarrow M$] among the Ist row of transition elements is– **Cu**	**TS-EAMCET (Engg.), 06.08.2021**
The electrode potential of M^{2+}/M for 3d series elements shows positive value for – **Cu**	**JEE Main 24.02.2021, Shift-I**
In the Daniell cell, Zn $\|Zn^+\|\|Cu^{2+}\|$ Cu, when an external voltage is applied such that $E_{external} > E_{cell}$, current flows from ..... .– **Zn to Cu**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
The standard electrode potential (**E^o**) values of Al^{3+}/Al, Ag^+/Ag, K^+/K and Cr^{3+}/Cr are –1.66 V, 0.88 V, –2.93 V and –0.74V, respectively. The correct decreasing order of reducing power of the metal is– **K > Al > Cr >Ag**	**(Odisha NEET 2019)**
Standard hydrogen electrode (SHE) is a– **primary reference electrode**	**MHT CET-02.05.2019, SHIFT-II**
Consider the following reduction processes: $Zn^{2+} + 2e^- \rightarrow Zn(s)$; $E^o = -0.76$ V $Ca^{2+} + 2e^- \rightarrow Ca(s)$; $E^o = -2.87$ V $Mg^{2+} + 2e^- \rightarrow Mg(s)$; $E^o = -2.36$ V $Ni^{2+} + 2e^- \rightarrow Ni(s)$; $E^o = -0.25$ V The reducing power of the metals increases in the order– **Ni < Zn < Mg < Ca**	**[JEE Main 2019, 10 Jan Shift-I]**
If one mole electrons is passed through the solutions of $AlCl_3$, $AgNO_3$ and $MgSO_4$, in ratio of Al, Ag and Mg will be deposited all the electrodes– **2 : 6 : 3**	**GUJCET-2019**
The statements is true for an electrochemical cell– **Oxidation occurs at the anode only.**	**J & K CET-(2018)**
The reaction is spontaneous if the cell potential is:– **positive**	**Manipal-2017**
The E^o values for Mn and Zn are more negative than expected because– **they have either half-filled and fully-filled configurations**	**JIPMER-2016**

TEAM-SPY

Search on TG: @apna_pdf

@apna_pdf

The value E^{o}_{rad} for metal, A,B and C are 0.34 volt -0.80 and -0.46 volt respectively state the correct order for their ability to act a reducing agent.– **B>C>A**	**GUJCET-2016, 2015**
In an electrochemical cell, anode and cathode are respectively– **negatively and positively charged electrodes**	**SRMJEEE – 2016**
The pressure of H_2 would be required to make emf of the hydrogen electrode zero in pure water at 25°C– **10^{-14} atm**	**AMU-2015**
In electrolytic refining of copper, the electrodes used are– **Anode is impure copper plate and cathode is pure copper plate**	**SCRA-2014**
The main function of the salt bridge is– **to keep the solution electrically neutral in two half-cells**	**Assam CEE-2014**
H_2 gas is liberated at cathode and anode both by electrolysis of the solution except in– **NaCl**	**BCECE-2013**
In a cell that utilizes the reaction $Zn(s) + 2H^+(aq) \longrightarrow Zn^{2+}(aq) + H_2(g)$ addition of H_2SO_4 to cathode compartment will.– **increase the E and shift the equilibrium to the right**	**UPTU/UPSEE-2012**
The reduction potential of an electrode can be increased by– **Decreasing the temperature**	**COMEDK-2012**
A saturated solution of KNO_3 is used to make salt bridge because– **the velocity of both K^+ and NO_3^- are nearly same**	**UP CPMT-2011**
The emf of a cell with 1 M solutions of reactants and products in solution measured at 25°C is called– **standard emf**	**SRMJEEE – 2011**
The standard E^{o}_{red} values of A, B, C are 0.68 V, –2.54 V, – 0.50 V respectively, The order of their reducing power is– **B > C > A**	**UP CPMT-2010**
Copper sulphate solution is electrolysed using copper electrode. The reaction taking place at anode is– **$Cu(s) \rightarrow Cu^{2+}(aq) + 2e^-$**	**CG PET- 2010**
The reaction that takes place at the anode during electrolysis is– **oxidation**	**SRMJEEE – 2009**
During the charging of a lead-acid storage battery, the cathode reaction is– **formation of PbO_2**	**AP - EAMCET (MEDICAL) - 2009**
In Daniell cell, anode and cathode are respectively– **$Zn \mid Zn^{2+}$ and $Cu^{2+} \mid Cu$**	**CG PET -2009**
Kohlrausch's law states that at– **Infinite dilution, each ion makes definite contribution to equivalent conductance of an electrolyte, whatever be the nature of the other ion of the electrolyte**	**(AIPMT -2008)**
The relationship between Gibb's free energy change (ΔG) and emf (E) of a reversible electrochemical cell is given by– **$\Delta G = -nFE$**	**J & K CET-(2008)**
The standard E°_{red} values of A, B and C are +0.68 V, – 2.54 V, – 0.50 V respectively. The order of their reducing power is– **B > C > A**	**MHT CET-2007**
If $K < 1.0$, what will be the value of ΔG^0 is– **Positive**	**GUJCET-2007**
The metal that does not displace hydrogen from an acid is :– **Hg**	**BCECE-2006**
For the feasibility of a redox reaction in a cell, the emf should be– **positive**	**J & K CET-(2005)**
The potential of platinum wire dipped into a solution of 0.1 M in Sn^{2+} and 0.01 in $Sn^{4+}$is– **$E^o + \frac{0.059}{2}$**	**JCECE - 2005**

Search on TG: @apna_pdf

@apna_pdf

Galvanic cell

Faradays are needed for reduction of 2.5 mole of $Cr_2O_7^{2-}$ into Cr^{3+} – **15**	**GUJCET-2007**
The charge required to liberate one gram equivalent of an element is :– **1 F**	**BCECE-2006**
1-Faraday of charge is passed through a solution of $CuSO_4$, the amount of copper deposit will be equal to its— **gram equivalent weight**	**BCECE-2016**
Faraday's constant is defined as– **charge carried by one mole of electrons**	**J & K CET-2010**
Number of Faraday required to get 1 g atom of Mg from $MgCl_2$ is– **2 F**	**JCECE-2016**
Faradays are required to reduce 1 mole of BrO_3^- to Br^-.– **6**	**JIPMER-2017**
The charge required for the reduction of 1 mole of MnO_4^- to MnO_2 is– **3F**	**Karnataka-CET-2018 AIIMS-2006**
The amount of the current in Faraday, is required for the reduction of 1 mole of $Cr_2O_7^{2-}$ ions to Cr^{3+} is– **6 F**	**Karnataka-CET-2016**
The coulombs of electricity are required for the oxidation of one mole of water of dioxygen– **1.93×10^5C**	**Karnataka-CET-2015**
1 C electricity deposits :– **electrochemical equivalent of Ag**	**Manipal-2016, MHT CET-2010**
According to Faraday's first law– $w = \frac{E \times I \times t}{96500}$	**MHT CET-2011**
During galvanisation of iron, the metal is used for coating iron surface– **Zinc**	**MHT CET-2018**
The standard emf of galvanic cell involving 3 moles of electrons in its redox reaction is 0.59 V. The equilibrium constant for the reaction of the cell is– **10^{30}**	**Karnataka CET- 2010**
The energy conversion involved in a galvanic cell is– **Chemical energy to electrical energy**	**AP-EAMCET-07.07.2022, Shift-I**
A galvanic cell transforms the energy released by a spontaneous redox reaction into electrical energy that can be used to perform work. In a galvanic cell, electrons flow from– **anode to cathode through the external circuit**	**J & K CET-(2019)**

Nernst equation

According to the expression $\Delta G^o = -nFE^o$, the cell reaction is spontaneous when (Notations and symbols carry their usual meanings)– **E^o is positive**	**J & K CET-(2017)**
If the E^0_{cell} for a given reaction has a negative value, the relationship for the values of ΔG^0 and K_{eq} is– **$\Delta G^0 > 0$; $K_{eq} < 1$**	**(NEET- II 2016, 2011)**
The products formed when an aqueous solution of NaBr is electrolysed in a cell having inert electrode are :– **H_2 Br_2 and NaOH**	**[AIIMS-2006]**
For n-electron redox reactions of the type $aA+bB \rightarrow cC+dD$, the cell potential can be expressed as– $E^\circ_{cell} - \frac{RT}{nF} \ln \frac{[C]^c[D]^d}{[A]^a[B]^b}$	**J & K CET-(2019)**
The degree of dissociation (α) of a weak electrolyte, A_xB_y is related to van't Hoff factor (i) by the expression– $\alpha = \frac{i-1}{(x+y-1)}$	**SRMJEEE – 2008**
For the electrochemical cell, $Ag^+\|AgCl\|KCl\|\|AgNO_3\|Ag^+$, the overall cell reaction is– **$AgCl(s) \rightarrow Ag^+ + Cl^-$**	**JIPMER-2018**

Search on TG: @apna_pdf

@apna_pdf

Conductance of electrolytic solution

Unit of equivalent conductance is :– **$ohm^{-1}cm^2(g-eq)^{-1}$**	**SRM JEE 2014 BCECE-2005, J & K CET-(2007, 2006, 2003)**
If an electrolytic solution has specific resistance x and y is the molarity of that solution, then molar conductance (λ_m) of that solution will be– **$\frac{1000}{xy}$**	**Tripura JEE-2022**
Zeta potential is– **Potential difference between fixed charged layer and the diffused layer having opposite charges**	**Kerala-CEE-29.08.2021**
The pair of electrolytes that possess same value for the constant (A) in the Debye-Huckel-Onsager equation, $\Lambda_m = \Lambda_m^o - A\sqrt{C}$ is– **NH_4Cl, NaBr**	**Karnataka-CET-2020**
The conductivity of an electrolytic solution decreases on dilution due to– **decrease in number of ions per unit volume**	**MHT CET-02.05.2019, SHIFT-III**
The decreasing order of electrical conductivity of the following aqueous solution is 0.1 M formic acid (A), 0.1 M acetic acid (B), 0.1 M benzoic acid (C).– **A > C > B**	**[JEE Main 2019, 12 April Shift-II]**
The SI unit of conductivity is– **Sm^{-1}**	**MHT CET-2017**
The order of equivalent conductances at infinite dilution for LiCl, NaCl and KCl is– **KCl > NaCl > LiCl**	**WB-JEE-2016**
The value of electrical resistance at super conductivity state is– **0**	**SRMJEEE – 2015**
Pure silicon doped with phosphorus is :– **n-type semiconductor**	**AP-EAMCET (Engg.) 2015**
Silicon doped with arsenic is– **n-type semiconductor**	**COMEDK 2015**
At a particular temperature, the ratio of equivalent conductance to specific conductance of a 0.01 N NaCl solution is– **$10^5 cm^3$**	**WB-JEE-2015**
The equivalent conductance at infinite dilution of a weak acid such as HF– **can best be determined from measurements on dilute solutions of NaF, NaCl and HCl**	**VITEEE- 2010**
For strong electrolytes the plot of molar conductance vs $\sqrt{C}$ is– **linear**	**VITEEE- 2007**
The charge carriers in p-type semiconductors are– **positive holes**	**SRMJEEE – 2009**
The electrical conductivity of metal decreases with increase of temperature, this is due to– **enhanced vibration of metal ions**	**SRMJEEE – 2011**
A solution of concentration C g equiv/L has a specific resistance R. The equivalent conductance of the solution is– **$\frac{1000}{RC}$**	**AP-EAMCET- (Engg.) - 2010**
By diluting a weak electrolyte, specific conductivity (K_c) and equivalent conductivity (λ_c) changes as– **K_c decreases, λ_c increases**	**CG PET -2009**
The equivalent conductance of NaCl at concentration C and at infinite dilution are λ_c and λ_∞ is given as– **$\lambda_c = \lambda_\infty - (B)\sqrt{C}$**	**[JEE Main 2014]**
Molar conductivity decreases with decrease in concentration– **both for strong and weak electrolytes**	**J & K CET-(2012)**
An electrolytic solution conducts electricity the current is carried by– **cations and anions**	**J & K CET-(2013)**

Search on TG: @apna_pdf

The expression in SI system relating the equivalent conductance (Λ_c), specific conductance (κ) and equivalent concentration (C) is– **$\Lambda_c = \frac{\kappa \times 1000}{C}$**	**J & K CET-(2009)**
The electrical conductance of a conductor related with length and area of cross section of the conductor– **$G = k.a.l^{-1}$**	**MHT CET-2014**
An increase in equivalent conductance of a strong electrolyte with dilution is mainly due to– **increase in ionic mobility of ions**	**(AIPMT -2010)**
The order of equivalent conductance's at infinite dilution in water at room temperature for H^+, K^+, CH_3COO^- and HO^- ions is– **$H^+ > HO^- > K^+ > CH_3COO^-$**	**WB-JEE-2013**
Molar conductances of $BaCl_2$, H_2SO_4 and HCl at infinite dilutions are x_1, x_2 and x_3 respectively. Equivalent conductance of $BaSO_4$ at infinite dilution will be:– **$(x_1+x_2-2x_3)/2$**	**[AIIMS-2011]**

Electrolytic cell and electrolysis

If electrolysis of aqueous $CuSO_4$ solution is carried out using Cu-electrodes, the reaction taking place at the anode is– **$Cu(s) - 2e^- \rightarrow Cu^{2+}(aq)$**	**WB-JEE-2019**
The products obtained at the cathode and anode respectively during the electrolysis of aqueous K_2SO_4 solution using platinum electrodes are– **H_2, O_2**	**AP-EAMCET – 2016**
The EMF of the cell Tl/Tl^{+1} (0.001M)$\|\|$ Cu^{2+}(0.01M)/ Cu is 0.83. The cell EMF can be increased by– **Increasing the concentration of Cu^{2+} ions**	**[BITSAT – 2016]**
Electrolytic reduction of alumina to aluminium by Hall-Heroult process is carried out :– **In the presence of cryolite which forms a melt with lower melting temperature**	**Manipal-2016**
During electrolysis of H_2O, molar ratio of H_2 and O_2 produced is– **2 : 1**	**BCECE-2016**
The reduction potential of hydrogen half-cell will be negative if– **P_{H_2} = 2 atm and $[H^+]$ = 1.0 M**	**[AIEEE 2011]**
In electrolysis of NaCl when Pt electrode is taken then H_2 is liberated at cathode while with Hg cathode it forms sodium amalgam because– **more voltage is required to reduce H^+ at Hg than at Pt**	**BCECE-2012**
A hypothetical electrochemical cell is shown below: $A\|A^+$ (x M)$\|\|$ B^+(y M) $\|$ B The emf measured is + 0.20V. The cell reaction is– **$A + B^+ \rightarrow A^+ + B$**	**(AIPMT -2006)**
The standard reduction electrode potentials of the three electrodes P, Q and R are respectively –1.76 V, 0.34 V and 0.8 V. Then– **metal P will displace the cation of R from its aqueous solution and deposit the metal R.**	**J & K CET-(2009)**
In electrolytic cell, cathode acts as an/a– **reducing agent**	**UP CPMT-2007**
The standard electrode potentials of Ag^+/Ag is +0.80 V and Cu^+/Cu is +0.34 V. These electrodes are connected through a salt bridge and if :– **copper electrode acts as anode then E°_{cell} is +0.46 V**	**Kerala-CEE-2005**

TEAM SPK

Search on TG: @apna_pdf

@apna_pdf

Batteries, fuel cell and corrosion

The hydrogen ion concentration in a standard hydrogen electrode is– **1 mol/L**	**J & K CET-(2019)**
Electrolyte used in Ni-Cd cell– **KOH**	**JCECE - 2018**
Zinc is used to protect iron from corrosion because– **E_{red} of Zn < E_{red} of iron**	**UPTU/UPSEE- 2013, 2010**
When a lead storage battery is discharged:– **sulphuric acid is consumed**	**JIPMER-2017**
The space in the dry cell is filled with– **MnO_2, $ZnCl_2$, NH_4Cl and a filter**	**COMEDK 2016**
A secondary cell is one– **can be recharged by passing current through it in the opposite direction**	**Karnataka-CET-2016**
In dry cell, the negative electrode is– **Zinc**	**MHT CET-2016**
Zinc can be coated on iron to produce galvanized iron but the reverse is not possible. It is because– **zinc has higher negative electrode potential than iron**	**(NEET-II 2016)**
The standard emf of Zn-Cu voltaic cell is– **1.1 V**	**SRMJEEE – 2015**
The cathode reaction in the dry cell will be– **$MNO_2 + NH_4^+ + e^- \rightarrow MnO(OH)+NH_3$**	**COMEDK 2015**
In the lead-acid battery during charging, the cathode reaction is– **reduction of Pb^{2+} to Pb**	**AMU-2015**
In H_2O_2 fuel cell the reaction occurring at cathode is– **$O_2(g) + 2H_2O(l) + 4e^- \rightarrow 4OH^-(aq)$**	**Karnataka-CET-2015**
The charging lead storage battery is– **$PbSO_4$ on anode is reduced to Pb**	**Karnataka-CET-2015**
The electrochemical cell stops working after sometime because :– **electrode potential of both the electrodes becomes equal**	**VITEEE- 2008**
The extent of charge of lead accumulator is determined by– **specific gravity of H_2SO_4 of the battery**	**AP-EAMCET (Engg.) 2013**
In a electrochemical cell, the reaction will be feasible when– **ΔG = –ve, E = +ve**	**COMEDK 2014**
During charging of lead storage battery, the reaction occurring at the cathode is– **$PbSO_4+2H_2O \longrightarrow 2PbO_2+4H^+ + SO_4^{2-} +2e^-$**	**AMU-2012**
The EMF of a Daniel cell may be increased by– **keeping low temperature**	**BCECE-2011**
In electrolysis of NaCl when Pt electrode is taken then H_2 is liberated at cathode while with Hg electrode if forms sodium amalgam– **more voltage is required to reduce H^+ at Hg than at Pt**	**CG PET -2007**
In galvanic cell, the salt bridge is used to– **complete the circuit**	**CG PET -2006**
In the electrolysis of aqueous solution of $CuSO_4$ using copper electrode, the process that takes place at the anode is– **$Cu \rightarrow Cu^{2+} + 2e^-$**	**J & K CET-(2009)**
Galvanic cell is a device in which :– **chemical energy is converted into electrical energy**	**J & K CET-(2008)**
Cell reaction is spontaneous, when– **$\Delta G°$ is negative**	**MHT CET-2008**
The efficiency of a fuel cell is given by– **$\Delta G/\Delta H$**	**(AIPMT -2007)**
When an acid cell is charged, then– **voltage of cell increase**	**UP CPMT-2014**
Anode in the galvanic cell is– **negative electrode**	**UP CPMT-2005**
Corrosion of iron is essentially an electrochemical phenomenon where the cell reactions are– **Fe is oxidised to Fe^{2+} and dissolved oxygen in water is reduced to OH^-**	**COMEDK 2018 JIPMER 2013**

Search on TG: @apna_pdf

@apna_pdf

9. Chemical Kinetics

Rate of a Chemical Reaction

- When a chemical reaction takes place, during the course of the reaction the rate of reaction: (excluding zero order)– **Keeps on decreasing with time**
- For the reaction $2NH_3 \rightarrow N_2 + 3H_2$, If $\frac{-d[NH_3]}{dt} = K_1[NH_3]$, $\frac{d[N_2]}{dt} = K_2[NH_3]$, $\frac{d[H_2]}{dt} = K_3[NH_3]$ then the relation between K_1,K_2 and K_3 is– **$1.5\ K_1 = 3\ K_2 = K_3$**
- On increasing the pressure three fold, the rate of reaction of $2H_2S + O_2 \rightarrow$ products, would increase– **27 times**
- Units of rate constant for second order reaction– **L $mol^{-1}s^{-1}$**
- The order of reaction is decided by– **Mechanism of reaction as well as relative concentration of reactants**
- The unit of rate and rate constant are same for a– **Zero order reaction**
- The number of molecules of the reactants taking part in a single step of the reaction is indicative of– **Molecularity of a reaction**
- Rate constant of a reaction (K) is 300 $L^2\ mol^{-2}\ s^{-1}$, the order of reaction– **Third**
- The rate equation for a reaction, $A \rightarrow B$ is $r = K[A]^0$. If the initial concentration of the reactant is a mol dm^{-3}, the half period of the reaction is– $\frac{a}{2k}$
- The order half-life period is independent of initial concentration– **First**
- The half-life period for a zero order reaction is– **Proportional to initial concentration**
- For a second order reaction, rate at a particular time is x. If the initial concentration is tripled, the rate will become– **9x**
- The expression to calculate time required for completion of zero order reaction is– $t = \frac{[R_o]}{k}$
- A first order reaction is 20% complete in 10 minutes. The specific rate constant for the reaction is– **0.0233 min^{-1}**
- For a first order reaction, the rate constant is 6.909 min^{-1}. The time taken for 75% conversion in minutes is– $\frac{2}{3}\log 2$
- In the first order reaction, the relation between the velocity constant (k_1) and half-life period ($t_{1/2}$) is– $t_{\frac{1}{2}} = \frac{0.693}{k_1}$
- The first order integrated rate equation is– $k = \frac{1}{t}\ln\frac{a}{a-x}$
- For the first order reaction, half-life is 14 sec, the time required for the initial concentration to reduce to 1/8 of its value is– **42 sec**
- A→B is a first order reaction. The initial concentration of A is 0.2 mol L^{-1}. After 10 min, the concentration of B is found to be 0.18 mol L^{-1}. The rate constant (in min^{-1}) for the reaction is– **0.2303**
- The ratio $t_{2/8} : t_{1/2}$ for the first order reaction is– **3**
- The hydrolysis of ethyl acetate $CH_3OOC_2H_5 + H_2O \xrightarrow{H^+} CH_3COOH + C_2H_5OH$ is the reaction of– **Pseudo first order**
- Under conditions a bimolecular reaction may be kinetically of first order– **When one of the reacting species is in large excess**
- The order of a reaction for an esterification process is– **Second**
- The activation energy in a chemical reaction is defined as– **The difference in energy of intermediate complex and the average energy of reactants**
- According to Arrhenius equation, the slope of log k vs $\frac{1}{T}$ plot is– $\frac{-E_a}{2.303R}$
- According to Arrhenius hypothesis, rate of reaction increases with– **Rise in temperature**
- Activation energy (E_a) and rate constant (K_1 and K_2) of a chemical reaction at two different temperatures (T_1 and K_2) of a chemical reaction at two different temperatures (T_1 and T_2) are related by: (where T_1 and T_2 are is final temp.)– $\ln\frac{k_2}{k_1} = \frac{-E_a}{R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$

TEAM SOY

Search on TG: @apna_pdf
@apna_pdf

- A reaction having equal energies of activation for forward and reverse reaction has– **$\Delta H = 0$**
- The effect of temperature on reaction rate is shown by– **Arrhenius equation**
- Chemical reaction with high E_a values are generally– **Very slow**
- The Arrhenius equation $k = Ae^{-\frac{E_a}{RT}}$ shows the dependence rate constant on temperature condition the rate constant k is smallest for a reaction– **Large E_a and low T**
- Activation energy is _____ to rate of reaction– **Inversely proportional**
- The rate of a reaction can be increased in general by all the factors except– **Increasing the activation energy**
- The energy of activation of positive catalyzed reaction as compared to that of an uncatalyzed reaction is– **Less**
- Chemical reactions have high E_a values are generally– **Very slow**
- For the decomposition of hydrogen iodide at 127°C, the fraction of molecules having energy equal to or greater than activation energy can be given as– $10^{\frac{-E_a}{921.2R}}$
- The threshold energy of a chemical reaction depends upon– **Nature of reacting species**
- The activation energy of a reaction is zero. The rate constant of the reaction– **Is nearly independent of temperature**
- Threshold energy is equal to– **Activation energy + energy of molecules**
- The reaction $2A + B \rightarrow$ Product. When concentration of B alone was doubled, the half life did not change. When concentration of A alone was doubled, the rate increased by two times. The unit of rate constant for this reaction is– **L $mol^{-1}s^{-1}$**
- The order of a reaction $A \rightarrow$ product in which half the reagent is reacted in half an hour, three quarters in one hour and seven -eight in one and half hour is– **1**
- A reaction was found to be second order with respect to concentration of carbon monoxide. If the concentration of carbon monoxide is doubled, with everything else kept the same, the rate of reaction will– **increase by a factor of 4**
- For a reaction : $\frac{1}{2}A \rightarrow 2B$ rate of disappearance of 'A' is related to the rate of appearance of B by the expression– $-\frac{d[A]}{dt} = \frac{1}{4}\frac{d[B]}{dt}$
- The role of a catalyst is to change– **Activation energy of reaction**
- In the presence of a catalyst, the heat evolved or absorbed during the reaction– **Remains unchanged**
- Activation energy of chemical reaction can be determined by– **Determining the rate constant at two temperatures**
- A first order reaction is 50% completed in 1.26×10^{14} s. How much time would it take for 100% completion is – **Infinite**
- The value of rate constant of a pseudo first order reaction– **Depends on the concentration of reactants present in excess**
- For a complex reaction– **Order of overall complex reaction is same as molecularity of the slowest step. Molecularity of the slowest step is never zero or non-integer.**
- During decomposition of an activated complex– **Energy is always released, Reactants may be formed.**
- According to Maxwell Boltzmann distribution of energy– **The fraction of molecules with most probable kinetic enery decreases at higher temperatures. Most probable kinetic energy increases at higher temperatures.**
- In the graph showing Maxwell Boltzman distribution of energy– **Area under the curve must not change with increase in temperature. With increase in temperature curve broadens and shifts to the right hand side.**
- When initial concentration of the reactant is doubled, the half-life period of a zero order reaction- **Is doubled**

Factors Affecting the rate of reaction

- The unit of rate constant and rate of reaction are same for– **Zero order**
- For a reaction of the type $aA + bB \longrightarrow$ products; $\frac{-d[A]}{dt}$ is equal to– $-\frac{a}{b} \times \frac{d[B]}{dt}$
- In a reaction, $2X + Y \longrightarrow X_2Y$, the X disappears at– **Twice the rate as that of appearance of X_2Y**
- During the course of a chemical reaction, the rate of a reaction– **Decreases as the reaction proceeds**
- A reaction involving two different reactants can never by– **Unimolecular reaction**
- For the hypothetical reaction $2A \rightarrow 3C$, the reaction rate 'r' in terms of the rate of change of the concentration is given be– $r = -\frac{1}{2}\frac{d[A]}{dt}$
- For reaction, $2B + A \longrightarrow 3C$– **Rate of appearance of C is twice that of rate of disappearance of A**

Search on TG: @apna_pdf

@apna_pdf

- For the homogeneous elementary reaction, A + B ⟶ C, the unit of rate constant is– **s^{-1} mol^{-1} L**
- The decomposition of phosphine [PH_3] on tungsten at low pressure is a first-order reaction. It is because the– **Rate is proportional to the surface coverage**
- The unit of rate constant for a zero order reaction is– **mol L^{-1} s^{-1}**
- The rate of the reaction, $2NO + Cl_2 \longrightarrow 2NOCl$ is given by the rate equation rate = $k[NO]^2[Cl_2]$. The value of the rate constant can be increased by– **Increasing the temperature**
- The given reaction $2\ FeCl_y + SnCl_2 \rightarrow 2FeCl_2 + SnCl_4$ is an example of– **Third order reaction**
- $3A \rightarrow 2B$, rate of reaction $\frac{+dB}{dt}$ is equal to– $-\frac{2}{3}\frac{d[A]}{dt}$
- $2A \rightarrow B + C$
  It would be a zero order reaction when– **The rate of reaction remains same at any conc. of A**
- If the rate of the reaction is equal to the rate constant, the order of the reaction is– **1**

Integrated rate equation, Pseudo first order reaction

- The inversion of cane sugar represented by $C_{12}H_{22}O_{11} + H_2O \rightarrow$ is $C_6H_{12}O_6 + C_6H_{12}O_6$ is a _____ reaction– **Unimolecular**
- For a Ist order reaction, a straight line is obtained if you plot– **log conc. vs time**
- The half life of a second order process, $2A \rightarrow$ product is– **Inversely proportional to initial concentration of A**
- When initial concentration of a reactant is doubled in a reaction, its half-life period is not affected. The order of the reaction is– **First**

Effect of temperature & the reaction rate, effect of catalyst

- The chemical reaction in the reactants require high amount of activation energy are generally– **Slow**
- The minimum amount of energy that the time of collision in order to produce effective collision is called– **Threshold energy**
- The graph between the log K versus $\frac{1}{T}$ is a straight line. The slope of the line is– $-\frac{E}{2.303R}$
- The temperature coefficient for most of the reaction lies between– **2 & 3**
- A chemical reaction is catalyzed by a catalyst X. Hence X– **Does not affect equilibrium constant of reaction**
- Carbon-14 dating method is based on the fact that– **Ratio of carbon-14 and carbon-12 is constant**
- Activation energy of a chemical reaction can be determined by– **Evaluating rate constants at two different temperatures**
- How enzymes increases the rate of reaction– **By lowering activation energy**
- The activation energy of a simple chemical reaction A → B is E_a in forward direction. The activation energy for reverse reaction– **Is always less than E_a**
- When a chemical reaction takes place, during the course of the reaction the rate of reaction– **Keeps on decreasing with time**
- The rate constant of a reaction depends upon– **Temperature of the reaction**
- Rate constant in case of first order reaction is– **Independent of concentration units**
- The rate law for a reaction, A + B → C + D is given by the expression k[A]. The rate of reaction will be– **Halved on reducing the concentration of A to half**
- The order of reaction is decided by– **Mechanism of reaction as well as relative concentration of reactants**
- Example of a fractional order reaction is a– **$CH_3CHO \rightarrow CH_4 + CO$**
- The rate equation for the reaction 2X + Y → Z, if the order of the reaction is zero will be– **Rate = k**
- For a reaction X → Y, the rate of reaction becomes twenty seven times when the concentration of X is increased three times. The order of the reaction is– **3**
- The number of molecules of the reactants taking part in a single step of the reaction is indicative of **Molecularity of a reaction**
- For a unimolecular reaction– **The order and molecularity of the slowest step are equal to one**
- The overall rate of a reaction is governed by– **The rate of slowest intermediate step**
- The reaction, 2X → Y + Z would be zero order reaction when– **Rate of reaction remains same at any concentration of X**
- The expression to calculate time required for completion of zero order reaction is– $t = \frac{[R_0]}{k}$
- A plot of log(a–x) against time t is a straight line. This indicates that the reaction is of– **First order**
- Radioactive disintegration is an example of– **First order reaction**
- In pseudo unimolecular reactions– **One of the reactant is present in excess**
- The time taken for 90% of a first order reaction to complete is approximately– **3.3 times that of the half-life**
- The activation energy in a chemical reaction is defined as– **The difference in energy of intermediate complex and the average energy of reactants**

JEE MAIN SPY

Search on TG: @apna_pdf
@apna_pdf

- For an endothermic reaction, ΔH represents the enthalpy of the reaction in kJ mol^{-1}. The minimum amount of activation energy will be– **More than ΔH**
- When a catalyst is used in an equilibrium process– **It fastens the attainment of equilibrium by lowering activation energy**
- The increase in concentration of the reactants lead to change in– **Collision frequency**
- Threshold energy is equal to– **Activation energy + energy of molecules**
- The role of a catalyst is to change– **Activation energy of reaction**
- In the presence of a catalyst, the heat evolved or absorbed during the reaction– **Remains unchanged**
- Activation energy of a chemical reaction can be determined by– **Determining the rate constants at two temperatures**
- A first order reaction is 50% completed in 1.26×10^{14} s. Total time would it take for 100% completion– **Infinite**
- For a reaction of order n, the unit of the rate constant is– **$mol^{1-n}\ L^{n-1}\ s^{-1}$**
- The rate constant has units L mol^{-1} s^{-1}. The order is– **2**
- The formation of gas at the surface of tungsten due to adsorption is the reaction of order– **0**

Collision theory of chemical reactions

- The increase in concentration of the reactants lead to change in– **Collision frequency**
- An increase in the concentration of the reactants of a reaction leads to change in– **Collision frequency**
- In collision theory of chemical reaction, Z_{AB} represents– **The collision frequency of reactants, A and B**
- Arrhenius parameter (A) depends on– **Steric factor,Collision frequency**

EXAM POINT

Rate of Chemical Reaction

For the reaction $2A \longrightarrow 4B + C$, if. $-\frac{d[A]}{dt} = k_1[A]$ $\frac{d[B]}{dt} = k_2[A]$ $\frac{d[C]}{dt} = k_3[A]$ then,– **$k_1 = 2k_3$**	**Assam-CEE-31.07.2022**
$3A \rightarrow 2B$, rate of reaction $\frac{+d(B)}{dt}$ is equals to– **$-\frac{2}{3}\frac{d(A)}{dt}$**	**COMEDK-2018, Karnataka-CET-2016 WB-JEE-2008, UP CPMT-2006 (AIPMT -2002)**
For the reaction : $H_2 + I_2 \longrightarrow 2HI$, the differential rate law is– **$-2\frac{d[H_2]}{dt} = -2\frac{d[I_2]}{dt} = \frac{d[HI]}{dt}$**	**MHT CET-2008, AIPMT - 1997**
The rate of a gaseous reaction is given by the expression $k[A][B]^2$. If the volume of vessel is reduced to one half of the initial volume, the reaction rate as compared to original rate is– **8**	**Kerala-CEE-29.08.2021 Karnataka-CET-2021**
For a chemical reaction $A + B \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} C \xrightarrow{k_2} D$. The rate $\frac{dc}{dt}$ is **$k_1[A][B] - k_{-1}[C] - k_2[C]$**	**TS-EAMCET 09.08.2021, Shift-I**
For the reaction$2H_2(g)+2NO(g) \rightarrow N_2(g)+2H_2O(g)$ the observed rate expression is, rate = $k_f[NO]^2[H_2]$. The rate expression for the reverse reaction is– **$k_b[N_2][H_2O]^2/[H_2]$**	[JEE Main 2020, 7 Jan Shift-II]
The rate of a reaction doubles when the initial concentration of the reactant is made four-fold. If the initial concentration is made 400 fold, then the rate will become :– **20 times**	**Manipal-2020**
For a reaction of the type aA + bB → Products, the $-\frac{d[A]}{dt}$ is equal to :– **$-\frac{a}{b} \times \frac{d[B]}{dt}$**	**Manipal-2019**

Search on TG: @apna_pdf

@apna_pdf

For the chemical reaction, $N_2(g)+3H_2(g) \rightleftharpoons 2NH_3(g)$ the correct option is– $-\frac{d[N_2]}{dt}=\frac{1}{2}\frac{d[NH_3]}{dt}$	**NEET-2019**
For a reaction scheme, $A \xrightarrow{k_1} B \xrightarrow{k_2} C$, if the rate of formation of B is set to be zero then the concentration of B is given by– $\left(\frac{k_1}{k_2}\right)[A]$	**[JEE Main 2019, 12 April Shift-I]**
For an elementary chemical reaction, $A_2 \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} 2A$, the expression for $\frac{d[A]}{dt}$ is– $2k_1[A_2]-2k_{-1}[A]^2$	**[JEE Main 2019, 10 Jan Shift-II]**
Burning the coal is represented is $C(s)+O_2(g) \rightarrow CO_2(g)$ The rate of this reaction is increased by– **Powdering the lumps of coal**	**J & K CET-(2019)**
For a first order gas phase reaction: $A(g) \rightarrow 2B(g) + C(g)$ P_0 is initial pressure of A and P_t is the total pressure at time 't'. Integrated rate equation is:– $\frac{2.303}{t}\log\left(\frac{2P_o}{3P_o - P_t}\right)$	**AIIMS 25 May 2019 (Evening)**
For the reaction : $A + 2B \rightarrow C + D$, the expression of rate of reaction will be:– $\frac{-1}{1}\frac{d[A]}{dt}=\frac{-1}{2}\frac{d[B]}{dt}$	**AIIMS 26 May 2019 (Evening)**
The reaction $A \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} M+C; M+B \xrightarrow{k_2} \text{products}$ The rate can be expressed as Rate $=\frac{k_1k_2[A][B]}{k_{-1}[C]}$	**CG PET -2019**
Instantaneous rate of reaction $3A + 2B \rightarrow 5C$ is _____.– $-\frac{1}{3}\frac{d[A]}{dt}=-\frac{1}{2}\frac{d[B]}{dt}=+\frac{1}{5}\frac{d[C]}{dt}$	**GUJCET-2019**
A reaction is given as $2P+Q \rightarrow$ products. If concentration of Q is kept constant and concentration of P is doubled then rate of reaction is– **quadrupled**	**COMEDK-2018**
Faster a chemical reaction, smaller is the– **Half-life**	**JCECE - 2018**
Average rate of reaction for the reaction. $2SO_2(g)+O_2(g) \longrightarrow 2SO_3(g)$ is written as– $-\frac{\Delta[O_2]}{\Delta t}$	**MHT CET-2016**
For a chemical reaction, $mA \rightarrow xB$, the rate law is $r = k[A]^2$ If the concentration of A is doubled, the reaction rat will be– **Quadrupled**	**Karnataka-CET-2016**
In a reversible reaction a catalyst will affect the rate of– **Forward and reverse reaction**	**CG PET- 2015**
Total order of reaction $X + Y \rightarrow XY$ is 3. The order of reaction with respect X is 2. State the differential rate equation for the reaction.– $-\frac{d[x]}{dt}=k[X]^2[Y]$	**GUJCET-2015**
For a reaction $2A \rightarrow 3B$, if the rate of formation of B is *x* mol/L, the rate of consumption of A is– **2*x*/3**	**J & K CET-(2015)**
For a reaction between A and B the order with respect to A is 2 and the other with respect to B is 3. The concentrations of both A and B are doubled, the rate will increase by a factor of– **32**	**Karnataka NEET-2013**
The rate of a chemical reaction doubles for every 10° rise in temperature. If the temperature increases by 60°, the rate of reaction increases– **64 times**	**COMEDK-2014**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

When a biochemical reaction is carried out in laboratory from outside of human body in the absence of enzyme than rate of reaction obtained is 10^{-6} times, then activation energy of reaction in the presence of enzyme is– **different from, E_a obtained in laboratory**	**CG PET -2007**
$3A \rightarrow 2B$, rate of reaction $\frac{+d(B)}{dt}$ is equals to– **$-\frac{2}{3}\frac{d[A]}{dt}$**	**CG PET -2007**
For a reaction of the type A+B→ products, it is observed that doubling the concentration of A caused the reaction rate to the four times as great, but doubling the amount of B does not affect the rate. The rate equation is– **Rate = $k[A]^2$**	**CG PET -2006**
For a reaction $\frac{1}{2}A \rightarrow 2B$, rate of disappearance of 'A' is related to the rate of appearance of 'B' by the expression– **$-\frac{d[A]}{dt} = \frac{1}{4}\frac{d[B]}{dt}$**	**[AIEEE 2008]**
In a multistep reaction, the overall rate of reaction is equal to the– **rate of slowest step**	**MHT CET-2011**
The value of rate constant for a reaction A is twice of reaction B at the same temperature. The difference in their energy of activation $\left(E_a^A - E_a^B\right)$ is.– **–RTln2**	**Assam-CEE-31.07.2022**
The unit of rate constant for a zero order reaction is– **mol $L^{-1}s^{-1}$**	**(AIPMT -Mains 2011) MHT CET-2010, CG PET -2004**
In the reversible reaction, $2NO_2 \underset{k_2}{\overset{k_1}{\rightleftharpoons}} N_2O_4$, the rate of disappearance of NO_2 is equal to– **$2k_1[NO_2]^2 - k_2[N_2O_4]$**	**JIPMER-2018, BCECE-2018 AMU-2015**
For a reaction A + B ⟶ C + D, doubling the concentration of both the reactants increases the reaction rate by 8 times and doubling the only B simply doubles the reaction rate. The rate law is given as:– **$r = k[A]^2[B]$**	**HP CET-2018, (AIPMT -2012)**
The rate constant of a reaction depends on– **temperature**	**JIPMER-2005, J & K CET-(1999)**
For a reaction A + 2B → Products, when concentration of B alone is increased half life remains the same. If concentration of A alone is doubled, rate remains the same. The unit of rate constant for the reaction is– **s^{-1}**	**Kerala-CEE-29.08.2021 Karnataka-CET-2021**
If the rate constant for a first order reaction is k, the time (t) required for the completion of 99% of the reaction is given by– **$t = \frac{4.606}{k}$**	**Kerala-CEE-29.08.2021, NEET -2019**
The plot of $t_{1/2}$ v/s $[R]_0$ for a reaction is a straight-line parallel to X-axis. The unit for the rate constant of this reaction is– **s^{-1}**	**Karnataka-CET-2019**
For a chemical reaction rate law is, rate = $k[A]^2[B]$. If [A] is doubled at constant [B], the rate of reaction– **increases by a factor of 4**	**MHT CET-02.05.2019, SHIFT-II**
In the reversible reaction, $2NO_2 \underset{k_2}{\overset{k_1}{\rightleftharpoons}} N_2O_4$ the rate disappearance of NO_2 is equal to– **$2k_1[NO_2]^2 - 2k_2[N_2O_4]$**	**JIPMER-2018**
For the chemical reaction, $2O_3 \rightleftharpoons 3O_2$ The reaction proceed as follows $O_3 \rightleftharpoons O_2 + O$ (fast) $O + O_3 \longrightarrow 2O_2$ (slow) The rate law expression will be– **$r = k'[O_3]^2[O_2]^{-1}$**	**JIPMER-2017**
A reaction : $A_2 + B \rightarrow$ Products, involves the mechanism : $A_2 \rightleftharpoons 2A$(fast) (A being the intermediate) $A + B \xrightarrow{k_2}$ Products (slow). The rate law consistent to this mechanism is: **rate = $k[A_2]^{1/2}[B]$**	**VITEEE-2016**

Search on TG: @apna_pdf

@apna_pdf

Two similar reactions have the same rate constant at 25ºC, but at 35ºC, one of the reaction has a higher rate constant than the other. The appropriate reason for this is– **due to different activation energies**	**JIPMER-2016**
The activation energy of a reaction is zero. The rate constant of this reaction– **is independent of temperature**	**CG PET- 2015**
The unit and value of rate constant and that of rate of reaction are same for– **zero order**	**JCECE - 2015**
In a reaction, A + B → C, the rate expression is R = k [A] $[B]^2$. If the concentration of both the reactant is doubled at constant volume, then the rate of the reaction will be– **eight times**	**UPTU/UPSEE-2015**
The quantity of K in a rate of expression :– **Is independent of concentration of reactants**	**MPPET-2013**
For a hypothetical reaction $A \rightarrow C$ $A \underset{k_2}{\overset{k_1}{\rightleftharpoons}} B$[Fast] $A + B \xrightarrow{k_3} C$(Slow) Rate law for this reaction is– **α[A][B]**	**VITEEE-2014**
The slope of the straight line for the graph drawn between k and $\frac{1}{T}$, where k is the rate constant of a reaction at temperature T is– $\frac{-E_a}{R}$	**AP-EAMCET- (Engg.) - 2010**
Unit of k for third order reaction is_____– $\left(\frac{\text{Mole}}{\text{Litre}}\right)^{-2} \times \text{sec}^{-1}$	**GUJCET-2007**
For the reaction, $2N_2O_5 \rightarrow 4NO_2 + O_2$ the rate of reaction is :– $\frac{1}{4}\frac{d}{dt}[NO_2]$	**[AIIMS-2006]**
The decomposition of N_2O_5 occurs as, $2N_2O_5 \longrightarrow 4N_2 + O_2$, and follows 1st order kinetics, hence : $t_{1/2} \propto a^0$	**BCECE-2006**
The rate constant of a reaction is 1×10^{-2} mol^{-2} L^2s^{-1}. The order of the reaction is– **3**	**BCECE-2009**
The chemical reaction $2O_3 \longrightarrow 3O_2$ proceeds as follows: $O_3 \underset{\text{Fast}}{\rightleftharpoons} O_2 + O$; $O + O_3 \xrightarrow{\text{Slow}} 2O_2$ The rate law expression should be– **$r = k[O_3]^2[O_2]^{-1}$**	**[BITSAT – 2009]**
A + B → Product If concentration of A is doubled, rate increases 4 times. If concentrations of A and B both are doubled, rate increases 8 times. The differential rate equation of the reaction will be– $\frac{dC}{dt} = kC_A^2 \times C_B$	**CG PET -2009**
It has been found that for a chemical reaction with rise in temperature by 10°C the rate constant is– **nearly doubled**	**J & K CET-(2014)**
In a reaction, 2A + B → A_2B, the reactant B will disappear at– **half the rate as A will decrease**	**J & K CET-(2011)**
The time required for 100% completion of a zero order reaction is– $\frac{a}{k}$	**Karnataka-CET-2011**

Factor Influencing the Rate of Reaction

In case of reversible gaseous reaction, a positive catalyst by decreasing the activation energy- **increases the rate of both forward and backward reactions**	**COMEDK-2011**
Enzymes increases the rate of reactions by– **Lowering activation energy**	**COMEDK-2016, (AIPMT-2000)**
A catalyst is a substance which– **increases the rate of both forward and backward reaction in a reversible reaction**	**J & K CET-(2013)**

JEAM SPY

Search on TG: @apna_pdf

@apna_pdf

The rate of the reaction intermediates can be determined by the study of– **concentration of the reactants**	**JCECE - 2011**
A catalyst is a substance which– **Changes the activation energy of the reaction**	**WB-JEE-2008**

Integrated rate equations

When initial concentration of the reactant is doubled, the half-life period of a zero order reaction– **is doubled**	**(NEET-2018)**
The rate constant and half-life of a first order reaction are related to each other as– $t_{1/2} = \frac{0.693}{k}$	**MHT CET-2016**
The relationship between rate constant and half-life period of zero order reaction is given by– $t_{1/2} = \frac{[A_0]}{2k}$	**MHT CET-2015**
When initial concentration of a reactant is doubled in a reaction, its half-life period is not affected. The order of the reaction is– **first**	**(NEET-2015, Cancelled)**
The half life period of second order reaction is proportional to– a^{-1}	**SRMJEEE – 2011**
The formula to find the value of $t_{1/2}$ for a Zero Order Reaction is– $\frac{[R_\circ]}{2K}$	**GUJCET-2008**
For n^{th} order reaction, the half-life period, $t_{1/2}$ is proportional to initial concentration as– $\frac{1}{a^{n-1}}$	**BCECE-2010**
For a first order reaction, the half-life period is– **independent on initial concentration**	**MHT CET-2008**
For a reaction $X \rightarrow Y$, the graph of the product concentration (x) versus time (t) came out to be a straight line passing through the origin. Hence, the graph of $\frac{-d[X]}{dt}$ and time would be– **A straight line parallel to x-axis**	**COMEDK-2016**
In a first order reaction with time the concentration of the reactant decreases– **exponentially**	**[BITSAT – 2015]**
The order of photochemical reaction between H_2 and Cl_2 is– **Zero**	**SCRA-2010**

Pseudo first order reaction

The relation to find out the half life a first order reaction is (k = rate constant of reaction, $[A]_o$ = Initial concentration of reactant)– $\frac{ln2}{k}$	**AP-EAPCET-12.07.2022, Shift-I**
In the reaction, A→products, If the concentration of the reactant is doubled, rate of the reaction remains unchanged. The order of the reaction with respect to A is— **0**	**AP-EAMCET-08.07.2022, Shift-I**
The unit of rate constant of a second order reactions– **L/mol-s**	**[BITSAT – 2015]** **CG PET -2009** **J & K CET-(2008, 2007)** **CG PET -2006**
For first order reaction, the value of slope for graph of $\log \frac{[R]_0}{[R]} \rightarrow t$ is ———.– $\frac{k}{2.303}$	**GUJCET-2021, 2022**
The value of rate constant of a pseudo first order reaction:– **Depends on the concentration of reactants present in the small amount**	**HP CET-2018** **Karnataka CET-2018**

Search on TG: @apna_pdf

@apna_pdf

For a reaction of order n, the unit of the rate constant is– **$mol^{1-n}\ L^{n-1}\ s^{-1}$**	**[JEE Main 2021, 27 July Shift-I]**
In a 1st order reaction, reactant concentration C varies with time t as:– **log C decreases linearly with t**	**[BITSAT – 2021]**
For zero order reaction, a plot of $t_{1/2}$ versus $[A]_0$ will be – **A straight line passing through origin and slope = $\frac{1}{2k}$**	**AP EAPCET 20.08.2021 Shift-I**
Formula for half-life of a zero order reaction is– **$\frac{C_o}{2k}$**	**JIPMER-2019**
For a first order reaction, a plot of log (a – x) against time is a straight line with a negative slope equal to– **$\frac{-k}{2.303}$**	AIIMS-25 May 2019 (Evening)
The rate expression of a reaction is Rate= $k\ [A]^{3/2}\ [B]^{-1}$ the order of the reaction will be of– **Half order**	**Assam CEE-2019**
If the rate equation for reaction is, rate $=k[A][B]^{1/2}$, the order of reaction is– **1.5**	**COMEDK-2019**
Under what condition the order of the reaction, $2HI \rightarrow H_2(g) + I_2(g)$, is zero– **at high partial pressure of HI**	**Kerala-CEE-2018**
The difference between first and second order reactions is that– **the half-life of a first-order reaction does not depend on $[A]_0$; the half-life of a second-order reaction depend on $[A]_0$**	**(NEET 2018)**
For the reaction, $2SO_2+O_2$ (excess) $\rightarrow 2SO_3$ the order of reaction with respect to O_2 is– **zero**	**UPTU/UPSEE-2016**
The order of the reaction for the oxidation of ferrous sulphate into ferric sulphate by potassium chlorate in the presence of sulphuric acid is– **2**	**J & K CET-(2016)**
In a first order reaction, the plot of log(a – x) against times 't' gives– **a straight line with negative slope**	**SRMJEEE – 2009**
If a plot of $\log_{10}C$ versus t gives a straight line for a given reaction, then the reaction is– **first order**	**VITEEE- 2008**
The order of the reaction $N_2O_5 \rightarrow N_2O_4(g) + \frac{1}{2}O_2(g)$ is– **1**	**VITEEE- 2006**
The time required for 100% completion of zero order reaction is– **$\frac{a}{k}$**	**COMEDK-2012**
For a chemical reaction ….. can never be a fractional number:– **Molecularity**	**AP-EAMCET (Medical), 2003**
For Fourth Order reaction, the unit of k is– **$(mole/litre)^{-3}\ second^{-1}$**	**GUJCET-2008**
For a first order reaction, to obtain a positive slope, we need to plot (where [A] is the concentration of reactant A)– **$-\log_e[A]$ v/s t**	**[AIIMS-2008]**
The rate constant of a reaction is 3.00×10^3 L mol^{-1} sec^{-1} . The order of this reaction will be– **second**	AMU – 2007
The rate constant of a reaction is 1.0×10^7 L^2 mol^{-2} sec^{-1}. The order of this reaction will be,– **third**	**AMU–2006**
$3A \rightarrow B + C$ It would be zero order reaction when– **The rate of reaction remains the same at any concentration of A**	**BCECE-2012**
If the initial concentration of the reactant is doubled, the time for half reaction is also doubled. The order of the reaction is– **zero**	**CG PET- 2012**
$2A \rightarrow B + C$ It would be a zero order reaction when– **the rate of reaction remains same at any concentration of A**	**CG PET-2007**

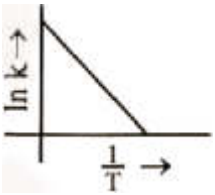
TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

Unit of first order rate constant is– **s^{-1}, min^{-1}etc.**	**CG PET-2006**
The expression for velocity constant for the second order reaction is– $k = \frac{1}{t}\frac{x}{a[a-x]}$	**CG PET-2006**
The half life period for a first order reaction is…. **Independent of concentration**	**GUJCET-2014**
For the reaction R → P a graph of [R] against time is found to be a straight line with negative slope. The order of reaction is– **Zero order**	**J & K CET-(2010)**
Inversion of cane-sugar in dilute acid is– **pseudo uni-molecular reaction**	**J & K CET-(2007)**
Order of reaction is decided by– **mechanism of reaction**	**JCECE - 2011**
For a zero order reaction- $t_{1/2} \propto R_0$	**JIPMER-2012**
For a reaction, the half–life is independent of initial concentration. What is the order of that reaction?– **One**	**JIPMER-2004**
Time required for 100 percent completion of a zero order reaction is- $\frac{a}{k}$	**Karnataka-CET, 2010**
For a zero order reaction, the plot of concentration of reactant vs time is (intercept refers to concentration axis)– **linear with – ve slope and non-zero intercept**	**Kerala-CEE-2008**
A first order reaction is given as A → products. Its integrated equation is– $k = \frac{2.303}{t}\log\frac{a}{a-x}$	**MHT CET-2011**
The first order integrated rate equation is– $k = \frac{1}{t}1n\frac{a}{a-x}$	**MHT CET-2010**
The order reaction, the unit of rate constant is time^{-1} – **First order**	**MHT CET-2009**
For a reaction, A+2B → C, rate is given by $+\frac{d[C]}{dt} = k[A][B]$, hence, the order of the reaction is– **2**	**MHT CET-2008**
Units of specific reaction rate for second order reaction is– **L $mol^{-1}s^{-1}$**	**UP CPMT-2011**
Order of reaction can be– **integer, fraction, zero**	**UP CPMT-2007**
In the hydrolysis of an organic chloride in presence of large excess of water, $RCl + H_2O \rightarrow ROH + HCl$– **molecularity is 2 but order of reaction is 1**	**WB-JEE-2010**
Acid catalyzed hydrolysis of ethyl acetate follows a pseudo-first order kinetics with respects to ester. If the reaction is carried out with large excess of ester, the order with respect to ester will be– **0**	**WB-JEE-2013**
The rate of a certain reaction is given by, rate = k $[H^+]^n$. The rate increases 100 times when the pH changes from 3 to 1. The order (n) of the reaction is– **1**	**WB-JEE-2014**

Temperature dependence of the rate of a reaction

Activation energy of any chemical reaction can be calculated if one knows the value of- **Rate constant at two different temperatures**	**NEET-05.05.2024**
The plot of ln k vs $\frac{1}{T}$ is consistent with Arrhenius equation- 	**NEET-05.05.2024**

Search on TG: @apna_pdf

@apna_pdf

The temperature dependence of rate constant (k) of a chemical reaction is written in terms of Arrhenius equation, $k = Ae^{-Ea}/RT$. Activation energy (E_a) of the reaction can be calculated by ploting. **$\log k$ vs $\frac{1}{T}$**	**JCECE - 2008, UPTU/UPSEE-2007 (AIPMT-2003)**
According to Arrhenius equation, the rate constant (k) is related to temperature (T) as– **$\ln\frac{k_2}{k_1}=\frac{E_a}{R}\left[\frac{1}{T_1}-\frac{1}{T_2}\right]$**	**AMU-2011, VITEEE- 2007**
The effect of a catalyst in chemical reaction is to change the– **activation energy**	AMU–2003, 2002
The activation energy for a simple chemical reaction $A \rightarrow B$ is E_a in forward direction. The activation energy for reverse reaction can be – **Less than or more than E_a**	**[BITSAT-2010], (AIPMT - 2003)**
The rate constant of a reaction is given by $k = PZe^{-E_a/RT}$ under standard notation. In order to speed up the reaction, factor has to be decreased is– **E_a**	**Karnataka-CET-2020**
The activation energy of a reaction is zero. The rate constant of this reaction– **is independent of temperature**	**Manipal-2020**
For an endothermic reaction where ΔH represent the enthalpy of reaction in kJ/mol, the minimum value for energy of activation (for forward reaction) will be– **more than ΔH**	**[BITSAT – 2017]**
A plot of ln k against $\frac{1}{T}$ (abscissa) is expected to be a straight line with intercept on ordinate axis equal to– **$\frac{\Delta S^\circ}{R}$**	**[VITEEE-2016]**
The slope of the graph drawn between ln k and $\frac{1}{T}$ as per Arrhenius equation gives the value (R = gas constant, E_a = Activation energy)– **$\frac{-E_a}{R}$**	**TP-EAMCET – 2016**
The unit of activation energy is– **$J\ mol^{-1}$**	**SRMJEEE – 2015**
The excess energy a molecule must possess to become active is known as– **activation energy**	**SRMJEEE – 2011**
The rate of reactions exhibiting negative activation energy.– **decreases with increasing temperature**	**J & K CET-(2012)**
Activation energy of a chemical reaction can be determined by– **determining the rate constants at two temperatures**	**JCECE - 2013**
According to the Arrhenius equation, a straight line is to be obtained by plotting the logarithm of the rate constant of a chemical reaction (log k) against– **$\frac{1}{T}$**	**JCECE - 2014**
In Arrhenius plot, intercepts is equal to– **ln A**	**UP CPMT-2006**
The minimum energy required for the reacting molecules to undergo reaction is – **activation energy**	**UPTU/UPSEE-2005**

Collision theory of chemical reactions

We increase the temperature, the rate of reaction increases because of– **more number of collisions**	**BCECE-2011**
Higher order (>3) reactions are rate due to– **low probability of simultaneous collision of all reacting species**	**Karnataka-CET-2021 Kerala-CEE-29.08.2021**
Rate of a reaction can be expressed by Arrhenius equation **$k = A \cdot e^{-E_a/RT}$**. In this equation, E_a represents– **The energy below which colliding molecules will not react**	**AP - EAMCET (MEDICAL) - 2009** [AIEEE 2006]

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

10. Classification of Elements and Periodicity in Properties

Genesis of Periodic Classification, Modern Periodic Law & Nomenclature of elements

- The third period of periodic table contains– **8 elements**
- Dobereiner triads is– **Cl, Br, I**
- The tenth element in the periodic table resumbles the element with atomic number– **2 as well as 54**
- The number of elements in the 5th period of the periodic table are– **18**
- The plot of square root of frequency of X-rays emitted against atomic number leds to the suggestion of which law (rule)– **Modern Periodic law**
- In the modern periodic table, elements are arranged in– **Increasing atomic number**
- The element was named as Eka-silicon in Mendeleev's classification of elements– **Germanium**
- Number of periods in the long form of periodic table are– **7**
- The long form of periodic table was based on– **Atomic number**
- The name of element with atomic number 105 is– **Dubnium**
- The name of element having atomic number 103 is– **Lawrencium**
- The elements in which electrons are progressively filled in 4*f* orbital are called– **Lanthanoids**
- The IUPAC name of an element with atomic number 119 is– **Ununennium**
- The ionic radii of K^+, Na^+, Al^{3+} and Mg^{2+} are in the order– **$Al^{3+} < Mg^{2+} < Na^+ < K^+$**
- The element with Z = 120 (not yet discovered) will be an/a– **Alkaline earth metal**
- For the second period elements the correct increasing order of first ionization enthalpy is– **Li < B < Be < C < O < N < F < Ne**
- The element with highest electron affinity is– **Chlorine**
- The isoelectronic set of ions is– **N^{3-}, O^{2-}, F^- and Na^+**

Electronic Configuration and Types of Elements

- The electronic configuration of elements of zero group (except He), can be represented by– **ns^2np^6**
- In transition element, the incoming electron ocupies (n-1)d subshell, in preference to– **np-level**
- The electronic configuration is - **[Xe] $6s^2$ $4f^{14}$ $5d^1$ – f block**
- Electronic configuration of the 4th transitional element is– **$1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1$**
- Meitnerium is the IUPAC official name of an element with atomic number– **109**
- The elements shown as pairs with their atomic numbers belong to the same period– **Z = 12 and Z = 17**
- In the long form of periodic table, the non-metals are placed in– **p-block**
- The electronic configurations is of transition elements– **$1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $3d^2$ $4s^2$**
- The groups that contains metals, non-metals and metalloids is– **Group 14**
- Ionic radius in a group while moving down– **Increases from top to bottom**
- The last element of the p-block in 6th period is represented by the outermost electronic configuration– **$4f^{14}$ $5d^{10}$ $6s^2$ $6p^6$**
- The electronic configuration of inner transition elements is– **$ns^2(n-1)\,d^{0-1}(n-2)f^{1-14}$**
- The ..... represents a d-block element– **[Xe]$5d^1$ $6s^2$**
- The electronic configuration of the element is just above the element with atomic number 43 in the same group is– **$1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $3d^5$ $4s^2$**
- The pair of atomic numbers represents s-block elements– **3, 12**
- Name an element of p-block of the periodic table in last electron goes to the s-orbital of valence shell instead of p-orbital– **He**
- The total no. of d-block elements in the atomic numbers is, 48, 28, 70, 100, 55, 45, 34, 36– **3**
- The block of the periodic tabel contains the element with configuration $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $3d^{10}$ $4s^1$– **d-block**

Search on TG: @apna_pdf

@apna_pdf

- The electronic configuration of gadolinium (atomic number 64) is– **[Xe] $4f^7$ $5d^1$ $6s^2$**
- An element of atomic number 29 belongs to– **d-block**
- The metal has 2 electrons in the outermost orbit is – **Be**
- Pd has exceptional electrons configuration of $4d^{10}$ $5s^0$. It belongs to– **5^{th} period, group10**
- Atomic number of Ag is 47. In the same group, the atomic numbers of elements placed above and below Ag in long form of periodic table will be– **29, 79**
- The sequence contain atomic number of only representative elements?– **3, 33, 53, 87**

Periodic Trends and Properties of the Elements-

- The radii of the F, F^-, O and O^{2-} are in the order– **$O^2 > F^- > O > F$**
- The correct is – $r_{ionic} \propto \frac{1}{Z_{eff}}$
- The isoelectroinc ions has lowest ionisation enthalpy– **S^{2-}**
- The element with highest electron affinity will belong to– **Period 3, group 17**
- The elements occupy the peaks of ionisation enthalpy curve are– **He, Ne, Ar, Kr**
- The largest ionisation enthalpy is – **$_{12}Mg$**
- The process refers to the inonisation enthalpy is – **$X(g) \rightarrow X^+(g) + e^-$**
- The largest size is – **Rb^+**
- The units are used frequently for atomic radii is – **Picometres**
- An atom of an element has electronic configuration 2, 8, 1. the statement is correct– **The element forms basic oxide**
- The correct order of ionic raddi for the ions S^{2-}, Cl^-, P^{3-}, Ca^{2+} is – **$Ca^{2+} < Cl^- < S^{2-} < P^{3-}$**
- The correct order of electron affinity of halogens is– **$Cl > F > Br > 1$**
- The electron affinity of Be is also similar to that of– **Ne**
- The pairs show diagonal relationship is – **Li, Mg**
- The element is expected to have highest electron affinity– **$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$**
- The amphoteric oxide is– **Al_2O_3**
- The order of electronegativity of N, O, F and P is– **F > O > N > P**
- The set of elements have strongest tendency to form anions is– **F, Cl, Br**
- The ions are arranged in correct order of increasing radii are– **Be^{2+}, Mg^{2+}, Na^+**
- Compared to the first ionisation enthalpy, the value of second ionisation enthalpy of an element is.– **Greater**
- Outermost configuration of most electronegative element of the periodic table is.– **$2s^2\ 2p^5$**
- In the ionisation enthalpy of the first species is less than that of the second– **S, P**
- Isoelectronic ions are those have– **Same electronic energy**
- The correct order for the size of C, N, P, S is – **N < C < S < P**
- The greatest electron affinity is – **Cl**
- The correct order of the size of the– **$Ca^{2+} < K^+ < Ar < Cl^- < S^{2-}$**
- The configuration represent atoms of element having the highest second ionisation enthalpy is – **$1s^2\ 2s^2\ 2p^6\ 3s^1$**
- The order of I^{st} ionization enthalpy elements Be, B, C, N, O is– **B < Be < C < O < N**
- The size of ionic species is correctly given in the order– **$Na^+ > Mg^{+2} > Si^{4+} > Cl^{+7}$**
- The favourable factor for cation formation– **Low ionisation enthalpy**
- The order of the size of aluminium species is – **$Al > Al^+ > Al^{2+}$**
- Generally, the first ionisation enthalpy increases along a period, but here are some exceptions not an exception is– **Na and Mg**
- The element californium belong to the family of– **Actinoid series**
- In 4^{th} period of periodic table, how many elements have one or more 4d electrons is – **2**
- Energy required for the ionisation of 0.02 gram atom of magnesium is x kJ. The amount of energy required to ionise 1 atom of magnesium is– $\frac{x \times 10^3}{0.02\,N_A}$ J
- Out of N, O, Ne, Na and Na^+, these species will have the maximum and minium I.E respectively– **Na^+, Na**
- The species Ar, K^+ and Ca^{2+} contain the same number of electrons. In order do their radii increase is – **$Ca^{2+} < K^+ < Ar$**
- The represents a d-block element is – **[Kr] $4d^{10}$ $5s^1$**
- The electronic configuration having maximum difference in first and second ionization enthalpies is– **$1s^2\ 2s^2\ 2p^6\ 3s^1$**
- The neutral oxides is – **CO**
- If you are given Avogadro's number of atoms of a gas 'X'. If half of the atoms are converted into $X^+_{(g)}$ by energy ΔH. The IE of X is– $\frac{2\Delta H}{N_A}$
- The elements Ca, Mg, P and Cl the order of increasing atomic redii is– **Cl < P < Mg < Ca**

JEAI SIR

Search on TG: @apna_pdf
@apna_pdf

- The electronic configuration of an element is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^{10}\ 4p^2$. The atomic number of the element, s just below the abvoe element in the periodic table is – **50**
- An element X with Z – 112 has been recently discovered group and period will it belong, respectively– **12, 7**
- The lowest I^{st} ionisation enthalpy is– **Li**
- The order best depicts the oxides' progressively less acidic nature is–
  $N_2O_3 > CO_2 > B_2O_2 > BeO > Li_2O$
- The correct order of atomic size/ionic size is–
  $H^- > Li^+ > Be^{2+} > H^+$
- On going from right to left in a period in the periodic table, the electronegativity of the elements– **Decreases**
- The ions represents the collection of isoelectronic species is –
  $K^+, Ca^{2+}, Sc^{3+}, Cl^-$
- Chloride ion and potassium ion are isoelectronic. then– **Chloride ion is bigger than potassium ion**
- The correct sequence which shows decreasing order of the ionic radii of the element is–
  $O^{2-} > F^- > Na^+ > Mg^{2+} > Al^{3+}$
- In a periodic table, the basic character of oxides–
  Decreases from left to right and increases from top to bottom
- Elements X, Y and Z have atomic numbers 19, 37 and 55 respectively statements is true about them- **Y would have an ionization potential between those of X and Z.**
- Fluorine has low electron affinity than chlorine because of– **Smaller radius of fluorine, high electron density**
- Consider the isoelectronic species, Na^+, Mg^{2+}, F^- and O^{2-}. The correct order of increasing length of their radii is– **$Mg^{2+} < Na^+ < F^- < O^{2-}$**
- The order of screening effect of electrons of s, p, d and f orbitals of a given shell of an atom on its outer shell electrons is– **s > p > d > f**
- The first ionisation enthalpies of Na, Mg, Al and Si are in the order.– **Na < Mg < Al < Si**
- The electronic configuration of Gadolinium (Atomic number 64) is– **[Xe] $4f^7\ 5d^1\ 6s^2$**
- Among halogens, the correct order of amount of energy released (electron gain enthalpy) is–
  F < Cl > Br > I
- The period number in the long from of the periodic table is equal to– **Maximum principal quantum number of any element of the period**
- The elements in electrons are progressively filled in 4f-orbital are called– **Lanthanoids**
- The correct order of size of the given species– **$I^- > I > I^+$**
- The element with atomic number 57 belongs to– **s-block**
- The elements with atomic number 35, 53 and 83 are all– **Halogens**
- Modern periodic law is– **The physical and chemical properties of the elements are periodic function of their atomic numbers.**
- Elements which generally exhibit multiple oxidation states and whose ions are usually coloured are– **Transition elements**
- Pd has exceptional electronic configuration of $4d^{10}\ 5s^0$. It belong to– **5^{th} period, group 10**
- The ..... pairs of atomic numbers represents elements belonging to the same group– **13 and 31**
- The symbol of element with atomic number Z = 109– **Unnilennium**
- An atom of an element has electronic configuration 2, 8, 1– **The element forms basic oxide**
- The element with highest electronegativity will belong to– **Period 2, group 17**
- IUPAC name of element having atomic number 108 is– **Unniloctium**
- The valence shell electronic configuration of transition elements is– **$ns^{0-2}(n-1)\ d^{1-10}$**
- Increase in atomic size down the group is due to– **Increase in number of orbit**
- The radii of second species is greater than that of first– **H, He**
- The elements Ca, Mg, P and Cl, the order of increasing atomic radii is– **Cl < P < Mg < Ca**
- Ionic radii are– **Inversely proportional to effective nuclear charge**
- The radii of F, F^-, O and O^{2-} are in the order–
  $O^{2-} > F^- > O > F$
- ..... ion has the largest radius– **Se^{2-}**
- When a neutral atom is converted into a cation its– **Size decreases**
- The order of the size of aluminium species–
  $Al > Al^+ > Al^{2+}$
- The size of ionic species is in the order–
  $Na > Mg^{+2} > Si^{4+} > Cl^{+7}$
- The t order of the size of iodine species is–
  $I^- > I > I^+$
- ..... has the smallest size– **Al^{3+}**
- The order of shielding effect of s, p, d and f orbitals is– **s > p > d > f**
- Ca^{2+} is isoelectronic with– **Ar**
- Be^{2+} is isoelectronic with the ion– **Li^+**
- The atomic radius of elements of series would be nearly the same– **Fe, Co, Ni, Cu**

Search on TG: @apna_pdf
@apna_pdf

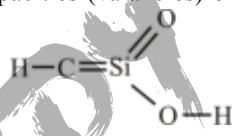
- With the electronic configuration an atom has the lowest ionization enthalpy– **$1s^2\ 2s^2\ 2p^6\ 3s^1$**
- The element with electronic configurations, have the highest ionization energy– **Ne $[3s^2 3p^3]$**
- The first ionization potentials (eV) of N and O respectively are– **11.32, 8.21**
- The order of Ist ionization potentials among elements Be, B, C, N, O is– **B < Be < C < N < O**
- The first ionization potentials (eV) of Be and B respectively are– **9.32, 8.29**
- Equation represents first enthalpy of ionization– **$Hg_{(g)} \rightarrow Hg^+_{(g)} + e^-$**
- The energy required to convert all atoms present in 1.2 g magnesium to Mg^{2+} ions if IE_1 and IE_2 of magnesium are 120 kJ mol^{-1} and 240 kJ mol^{-1} respectively– **18 kJ**
- The process requiring absorption of energy is– **$H \rightarrow H^+$**
- The order of metallic character for Si, Be, Mg, Na and P is– **P < Si < Be < Mg < Na**
- The electronegativity the order is– **F > O > Cl > Be**
- The least electronegative element has the electronic configuration– **ns^2np^6**
- The oxide is expected to react readily with NaOH– **Cl_2O_7**
- The most basic hydroxides is– **$La(OH)_3$**
- The elements that has been discovered recently and is radioactive – **Livermorium**
- Law of octaves stated– **Every eighth element had properties similar to the first element**
- The first periodic law stated by Mendeleev was– **The properties of the elements are a periodic function of their atomic weights**
- In the long form of periodic table, elements are arranged in the increasing order of– **Atomic number**
- The period an element belongs to in the long form of periodic table represents– **Principal quantum number**
- Elements belonging to the same group of periodic table have– **Same number of valence electrons**
- The name and symbol of the element with atomic number 112 is– **Copernicium, Cn**
- An element with atomic number 117 is known as– **Tennessine**
- The order of successive ionisation enthalpies is– **$IE_{III} > IE_{II} > IE_I$**
- The group of elements shows lowest ionisation enthalpy is – **Alkali metals**
- The first ionisation enthalpy of the elements C, N, P, Si are in the order of– **Si < P < C < N**
- Ionisation enthalpy of nitrogen is more than oxygen because of– **Extra stability of half filled orbitals**
- Of the metals Be, Mg, Ca and Sr of group 2 in the periodic table, the least ionisation enthalpy is for–**Sr**
- Beryllium has higher ionisation enthalpy than boron. This can be explained as– **It is easier to remove electron from 2p-orbital as compared to 2s-orbital due to more penetration of s-electrons**
- Ionisation enthalpies of transition metals are– **Intermediate between those of s- and p-block elements**
- The properties of isotopes of an element that is different are– **Melting point and boiling point**
- For noble gases, have positive electron gain enthalpy– **It is difficult to add an electron due to stable configuration**
- As we move from left to right, the electronegativity increases. An atom is highly electronegative has– **High ionisation enthalpy**
- An element X has atomic number 19. The formula of its oxide will be– **X_2O**
- An element 'P' has atomic number 56. The formula of its halide will be– **PX_2**
- Predict the formula of stable compound formed by an element 'A' with atomic number 114 and fluorine– **AF_4**
- There are many elements in the periodic table exhibit variable valency. This is a particular characteristic of– **Transition elements**
- The oxidation state of an element in a particular compound can be defined as– **The charge acquired by its atom on the basis of electronegative consideration from other atoms in the molecule**
- Electropositive or metallic character– **Decreases along a period and increases down a group**
- The main reason for showing anomalous properties of the first member of a group in s or p-block is– **small size, large charge/radius ratio**
- When we go from left to right in a period– **The basic nature of the oxides decreases**
- The common property of the oxides CO, NO and N_2O is– **All are neutral oxides**
- The sets of oxides is amphoteric in nature– **Al_2O_3, As_2O_3, ZnO**
- The most electropositive element is– **Cs**
- Among the elements with atomic numbers 9, 12, 16 and 36 is highly electropositive– **Element with atomic number 12**
- The order of screening effect of electrons of s, p, d and f orbitals of a given shell of an atom on its outer shell electrons is– **s > p > d > f**
- The first ionization enthalpies of Na, Mg, Al and Si are in the order– **Na < Mg > Al < Si**
- The period number in the long form of the periodic table is equal to– **Maximum principal quantum number of any element of the period**

TEAMSPY

Search on TG: @apna_pdf

@apna_pdf

EXAM POINT

Genesis of periodic classification modern periodic law sand nomenclature of elements.		
……does NOT show-2 oxidation state-	Po	**NEET-05.05.2024**
The oxidation number of K in KO_2 is	**+4.**	**NEET-17.07.2022**
The average oxidation number of bromine in Br_3O_8 is–	$\frac{16}{3}$	**Kerala CEE -03.07.2022**
The stability order of group 13 element in their +1 oxidation state.–	**Al < Ga < In < Tl**	**JEE Main-26.06.2022, Shift-I**
The compounds an element exhibits two different oxidation states is–	**NH_4NO_3**	**Karnataka CET-17.06.2022, Shift-II**
Identify the element for which electronic configuration in +3 oxidation state is $[Ar]3d^5$.–	**Fe**	**(JEE Main 2021, 1 Sep Shift-II)**
The structures does not correctly represent the bonding capacities (valancies) of the atoms involved is– 		**AP EAPCET-6 Sep. 2021, Shift-II**
The order of electron releasing tendency of metals is–	**Ag > Cu > Zn**	**NDA (II)-2019**
The element that forms stable compounds in low oxidation state is–	**Tl**	**TS EAMCET-2017**
The valency of an element depends upon the–	**total number of electrons in the outer most shell of an atom**	**NDA (I)-2017**
The number of electrons is the valence shell of the central atom of a molecules is 8. The molecule is–	**SCl_2**	**AP EAMCET (Engg.) -2014**
The valency shell of element A contains 3 electrons while the valency shell of element B contains 6 electrons. If A combines with B, the probable formula of the compound formed will be–	**A_2B_3**	**BITSAT-2014**
Variable valency is a general feature of :–	**d-block elements**	**MPPET-2013**
Compound that non-existent is–	**BF_6^{3-}**	**AMU – 2010**
The valency of the element having atomic number 9 is–	**1**	**MPPET- 2009**
The oxidation number of O in OF_2 is–	**+2**	**BCECE-2009**
The oxidation state of oxygen is zero in–	O_3	**CG PET -2007**
The number of electrons in the valence shell of sulphur in SF_6 is:–	**12**	**UPTU/UPSEE-2005**
Xenon hexafluoride reacts with silica to form a xenon compound X. The oxidation state of xenon in X is :–	**+6**	**AP-EAMCET (Engg.)-2004**
Metals having ns^1 as the valence electronic configuration:–	**are highly electropositive**	**AP-EAMCET (Med.)-1999**
The covalent molecules is an exception of octet rule–	**$BeCl_2$**	**AP-EAMCET/1999**
The sequence is with reference to the oxidation number of iodine–	**$HI < I_2 < ICl < HIO_4$**	**AP EAMCET- 1997**
The oxidation state of sodium in sodium amalgam is–	**zero**	**AP EAMCET- 1996**
The oxidation state of iodine in ICl_2^- is–	**+1**	**AP EAMCET- 1995**
The Oxidation number of chlorine in $KClO_3$ is–	**+5**	**AP EAMCET- 1993**
The sulphur has the lowest oxidation state is–	**H_2S**	**AP EAMCET- 1993**
An f-shell containing 6 unpaired electrons can exchange–	**15 electrons**	**VITEEE, 2014**

Search on TG: @apna_pdf

@apna_pdf

The interaction energy of London forces between two particles is proportional to r^x, where r is the distance between the particles. The value of x is– **–6**	**(JEE Main 2021, 26 Aug. Shift-II)**
In the modern periodic table the acidic nature of oxides_____.– **Increases from left to right and decreases from top to bottom**	**AP-EAMCET 25-08-2021 Shift - I**
The plot of square root of frequency of X-ray emitted against atomic number led to suggestion the law of/rule – **Modern periodic law**	**MHT CET-2014**
The least stable ion is:– **Be^-**	**MPPET-2013**
The incomplete octet is– **BCl_3**	**UP CPMT-2012**
Atomic numbers of elements X,Y and Z are 50, 78 and 60 respectively. these elements are placed in modern long from of Periodic Table respectively in– **p- block, d-block and f-block**	**CG PET- 2011**
The Periodic Table, the s-block element has, in general, a higher value of– **atomic radius**	**JIPMER-2010**
Ortho and para- hydrogen have– **Identical chemical properties but different physical properties**	**WB-JEE-2010**
In a periodic table the basic character of oxides– **decreases from left to right and increases from top to bottom**	**WB-JEE-2010**
The pairs the radius of the second species is greater than that of the first is– **O^{2-}, N^{3-}**	**Kerala-CEE-2007**
The does not exhibit the periodicity in properties of the elements is– **p- block**	**CG PET -2005**
The does not exhibit the periodicity in properties of the elements is– **n/p ratio**	**CG PET -2005**
The first artificial disintegration of an atomic nucleus was achieved by:– **Rutherford**	**JCECE - 2005**
As per the modern periodic law, "the physical and chemical properties of elements are periodic functions of their– **Atomic number"**	**A.P.EAMCET 1998**
In the long form of Periodic Table, the elements having lowest ionization potential are present in– **I group**	**A.P.EAMCET 1992**
The law of triads is applicable to a group of– **Cl, Br, l**	**JEE Main, 24.09.2019**
The electronic configurations corresponds to an inert gas is– **$1s^2, 2s^2, 2p^6$**	**BITSAT-2010 A.P.EAMCET 1993 NEET-1989**
The pairs has both members from the same period of periodic table :– **Na, C*l***	**BITSAT 2010 BCECE-2006**
Identify the correct order of the size of the following.– **$Ca^{2+} < K^+ < Ar < Cl^- < S^{2-}$**	**NEET-2010, 2007**
The order of increasing electron gain enthalpy with negative sign for the elements O, S, F and Cl is – **O < S < F < C*l***	**NEET-2010, 2005**
The set of elements that differ in mutual relationship from those of the other sets is– **Li-Na**	**(JEE Main 2021, 17 March Shift-II)**
From the given pairs of elements, the set of elements that does not possess–**Li – Al**	**TS EAMCET 10.08.2021, Shift-II**
In general, the properties that decrease and increase down a group in the periodic table, respectively are– **electronegativity and atomic radius**	**(JEE Main 2019, 9 Jan Shift-I)**
The octet around has central atom?– **CCl_4**	**JIPMER-2019**
For transition elements, that d-electrons are filled monotonically with increase in- **atomic number**	**Kerala-CEE-2018**
An element has $[Ar]3d^1$ configuration in its +2 oxidation state. Its position in the periodic table is– **period-4, group - 3**	**AP-EAMCET – 2016**
The most acidic oxide among the oxides based on their reaction.– **Cl_2O_7**	**AP-EAMCET (Engg.) 2015**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

The element, with atomic number 118, will be– **noble gas**	**BITSAT-2015**
The element with atomic number 117 has not been discovered yet. In which family would you place this element if discovered?– **Halogens**	**AIIMS-2014**
The number of elements present in the fourth period is– **18**	**AP-EAMCET (Engg.) 2013**
The screening effect of d-electrons is– **Less than p-electrons**	**BITSAT-2013**
Properties of elements are periodic function of number of_____ present in the nucleus.– **protons**	**J & K CET-(2012)**
As we move from left to right in the 3d-series elements– **electropositive character decreases and electronegative character increases**	**COMEDK-2011**
Beryllium and aluminium exhibit many properties which are similar. But, the two elements differ in– **exhibiting maximum covalency in compounds**	**BITSAT-2011**
Number of elements presents in the fifth period of Periodic Table is– **18**	**JCECE - 2010**
The effective nuclear charge is equal to– **$Z-\sigma$**	**SRMJEEE – 2009**
Lattice energy of an ionic compound depends upon– **charge on the ion and size of the ion**	**AP - EAMCET(MEDICAL) - 2009**
Beryllium resembles much with:– **Al**	**BITSAT 2009**
The properties of lithium does not show diagonal relationship with magnesium is– **Formation of Li^+ ion**	**CG PET -2009**
Increase in atomic size down the group is due to– **increase in number of electrons**	**BCECE-2008**
On moving from left to right in the second period along the periodic table the gram atomic volume of the element– **decreases**	**CG PET-2007**
The elements represents highly electropositive as well as highly electronegative character in its period is– **Hydrogen**	**BITSAT-2007**
The group of elements in which the differentiating electron enters the antipenultimate shell of atoms are called– ***f*-block elements**	**J & K CET-(2007)**
For the diagonal relation of lithium with magnesium is– **Diagonal relationship**	**UPTU/UPSEE-2006**
The stability of ferric ion is due to:– **half filled d- orbitals**	**BCECE-2006**
p-orbital in a given shell can accommodate upto– **six electrons**	**BCECE-2005**
In the periodic table metallic character of elements shows one of trend is:– **Increases down the group and decreases across the period**	**JCECE - 2005**
The number of electrons present in the valence shell of S in SF6 is- **12**	**AP-EAMCET/2005**
The relationship between the pH of isomolar solutions of sodium oxide, Na_2O (pH_1), sodium sulphide, Na_2S (pH_2), sodium selenide, Na_2Se (pH_3) and sodium telluride Na_2Te(pH_4)– **$pH_1 > pH_2 > pH_3 > pH_4$**	**NEET-2005**
The most pronounced inert pair effect is– **Pb**	**J & K CET-(2004)**
The element with atomic number 12 belongs to --- group and --- period.– **II A, third**	**A.P.EAMCET 2001**
The group of periodic table contains no metal is– **VIIA**	**AIIMS-1999**
The elements that has the lowest first ionization potential is– **oxygen**	**A.P.EAMCET 1994**
The smallest size is– **Al^{3+}**	**NEET-1994**
One of the characteristic properties of non-metals is that they–**an electronegative**	**NEET-1993**
The minimum value has of cation/anion ratio is– **$MgCl_2$**	**NEET-1993**

Search on TG: @apna_pdf

@apna_pdf

The sets has strongest tendency to form anions is– **N, O, F**	**NEET-1993**
The has largest size is– **Cl^-**	**NEET-1993**
Na^+, Mg^{2+}, Al^{3+} and Si^{4+} are isoelectronic. The order of their ionic size is– **$Na^+ > Mg^{2+} > Al^{3+} > Si^{4+}$**	**NEET-1993**
In the periodic table from left to right in a period, the atomic volume– **first decrease then increase**	**NEET-1993**

Electronic configuration and types of element

The IUPAC name of an element with atomic number 119 is– **ununennium**	**NEET-17.07.2022**
The atomic number of the element unnilennium is– **109**	**(JEE Main 2020, 3 Sep Shift-I)**
The IUPAC name of an element is Unbinilium. Its atomic number is– **120**	**Kerala-CEE-2020**
The name of the element with atomic number 105 is– **Dubnium**	**UPTU/UPSEE-2012**
The name of the element with atomic number 100 was adopted in honour of– **Enrico Fermi**	**A.P.EAMCET 1995**
The electronic configuration of the element with maximum electron affinity is– **$1s^2, 2s^2, 2p^6, 3s^2, 3p^5$**	**Kerala-CEE-2008**
The configurations represents atom of the element having the highest second ionization energy is– **$1s^2\ 2s^2\ 2p^6\ 3s^1$**	**J & K CET-(1998)**
A large increase from the first to the second ionisation energy of an element 'A' can be seen if its electronic configuration is– **$1s^2 2s^2 2p^6 3s^1$**	**SRMJEEE – 2012**
Highest energy will be absorbed to eject out the electron in the configuration.– **$1s^2 2s^2 2p^3$**	**JIPMER-2016**
The electronic configuration of group XIII elements is– **$ns^2 np^1$**	**A.P.EAMCET 2000**

Periodic trends and properties of the elements

Arrange the elements in increasing order of electronegativity N,O, F, C, Si- **Si < C N < O < F**	**NEET-05.05.2024**
Arrange the elements in increasing order of first ionization enthalpy: Li, Be, B, C, N- **Li < B < Be < C < N**	**NEET-05.05.2024**
The order of increasing ionic radii is– **$Mg^{2+} < Na^+ < F^- < O^{2-} < N^{3-}$**	**JEE Main-27.06.2022, Shift-II**
Decreasing size of ions is- **$I^- > I > I^+$**	**CG PET -2007, BCECE-2005 MPPET-2000, NEET-1996 PBCET-1986**
The sequence shows decreasing order of the ionic radii of the elements is– **$O^{2-} > F^- > Na^+ > Mg^{2+} > Al^{3+}$**	**JEE Main-04.09.2020, Shift-I JEE Main-05.09.2020, Shift-II AIEEE 2010, J&K CET-1997**
The ionic radii (in Å) of N^{3-}, O^{2-}, and F^- respectively are– **1.71, 1.40, and 1.36**	**CG PET -2018 (JEE Main 2015) J & K CET-(2003)**
Ionic radii are– **inversely proportional to effective nuclear charge**	**JCECE – 2008, NEET-2004 UPTU/UPSEE-2007**
Due to lanthanoid contraction ……. elements exhibit similar radii.– **Zr and Hf**	**NEET-2021 JCECE - 2018**
The ionic radii is correctly represented as– **$H^- > H > H^+$**	**NEET-2014 Karnataka-CET-2018**

TEAM SPM
Search on TG: @apna_pdf
@apna_pdf

The set representing the correct order of ionic radius is– **$Na^+ > Li^+ > Mg^{2+} > Be^{2+}$**	**UPTU/UPSEE-2015 (AIEEE 2009)**
The ionic radii of N^{3-},O^{2-}, F^- and Na^+ follow the order– **$N^{3-} > O^{2-} > F^- > Na^+$**	**UPTU/UPSEE-2012 CG PET -2008, 2007**
Ce^{3+}, La^{3+}, Pm^{3+} and Yb^{3+} have ionic radii in the increasing order as– **$Yb^{3+} < Pm^{3+} < Ce^{3+} < La^{3+}$**	**[BITSAT-2005] (AIEEE 2002)**
The order of ionic radius of nitrogen family is– **$N^{3-} < P^{3-} < As^{3-} < Sb^{3-} < Bi^{3-}$**	**Manipal-2020 CG PET- 2015**
The order of radii is– **$F^- < O^{2-} < N^{3-}$**	**BITSAT 2011 J & K CET-(2004)**
The ions O^{2-}, F^-, Na^+, Mg^{2+} and Al^{3+} are isoelectronic. Their ionic radii show :– **A significant decrease from O^{2-} to Al^{3+}**	**BITSAT 2013, NEET-2003**
The radii of F, F^- O and O^{2-} are in the order– **$O^{2-} > F^- > O > F$**	**BITSAT 2005 AP EAMCET (Medical) - 1998**
The ionic radius of Na^+ ions is 1.02 Å. The ionic radii (in Å) of Mg^{2+} and Al^{3+}, respectively, are– **0.72 and 0.54**	**[JEE Main-2021, 18 March Shift-I]**
Effective nuclear charge is Maximum in case of_____ **Fluorine**	**AP EAPCET 24.08.2021 Shift-II**
The property increases, as we move down group–I of the periodic table is– **Ionic radius**	**AP EAPCET-6 Sep. 2021, Shift-II**
The order of ionic radii of the given species:– **$S^{2-} > K^+ > Sc^{3+} > V^{5+} > Mn^{7+}$**	**AP EAPCET 25.08.2021, Shift-II**
The compound shows the highest lattice energy is– **LiF**	**AP EAPCET 23-08-2021 Shift-I**
The ions S^{2-}, Cl^-, K^+, Ca^{2+} are iso-electronic. Their ionic radii show _____– **A significant decrease from S^{2-} to Ca^{2+}**	**AP EAPCET 23-08-2021 Shift-I**
The ionic radii of F^- and O^{2-} respectively are 1.33 Å and 1.4 Å while the covalent radius of N is 0.74Å. The correct statement for the ionic radius of N^{3-} from is– **it is bigger than O^{2-} and F^-**	**(JEE Main 2021, 25 July Shift-II)**
The correct order of ionic radii for the ions, P^{3-}, S^{2-}, Ca^{2+}, K^+, Cl^- is– **$P^{3-} > S^{2-} > Cl^- > K^+ > Ca^{2+}$**	**(JEE Main 2021, 27 Aug Shift-II)**
In general, the property (magnitudes only) that shows an opposite trend in comparison to other properties across a period is– **atomic radius**	**(JEE Main 2020, 2 Sep Shift-I)**
The difference between the radii of 3rd and 4th orbits of Li^{2+} is ΔR_1. The difference between the radii of 3rd and 4th orbits of He^+ is ΔR_2. Ratio $\Delta R_1 : \Delta R_2$ is– **2 : 3**	**[JEE Main 2020, 5 Sep Shift-I]**
Two metals A and B having similar ionic radii, react with oxygen to give only monoxides and react with nitrogen to give nitrides. Then, A and B respectively are– **Li and Mg**	**AP EAMCET (Engg.) 17.09.2020 Shift-I**
The atomic radius of Ag is closest to– **Au**	**(JEE Main 2020, 7 Jan Shift-I)**
The order of the given elements with respect to their size is – **$Zn > Fe > Fe^{2+} > Fe^{3+}$**	**AP EAMCET (Engg.) 21.09.2020, Shift-II**
The order of the atomic radii of C, Cs, Al and S is– **C < S < Al < Cs**	**(JEE Main 2019, 11 Jan Shift-I)**
The ionic species radius would be maximum is– **C^{4-}**	AIIMS 25 May 2019 (Evening)
The order of atomic radii is– **Eu > Ce > Ho > N**	**(JEE Main 2019, 12 Jan Shift-II)**
The least covalent radius is– **Ni**	AIIMS 26 May 2019 (Morning)

Search on TG: @apna_pdf

@apna_pdf

The increasing order of size for the ionic species Na^+, F^-, O^{2-}, Mg^{2+} is– **$Mg^{2+} < Na^+ < F^- < O^{2-}$**	**Assam CEE-2019**
The set of elements have nearly the same atomic radii is– **Fe, Co, Ni, Cu**	**CG PET -2019**
The increasing order of ionic or atomic radii in– **$Cl^{7+} < S^{6+} < P^{5+} < Si^{4+}$**	**J & K CET-(2018)**
The energy and radius of electron present in second orbit of He^+ respectively are– **-2.18×10^{-18} J, 105.8 pm**	**AP EAMCET-2017**
The set representing the right order of ionic radius is– **$Na^+ > Li^+ > Mg^{2+} > Be^{2+}$**	**TS EAMCET-2017**
Atomic radius (pm) of Al, Si, N and F respectively is– **143, 117, 74, 64**	**TS EAMCET-2017**
The ion having the highest mobility in aqueous solution is– **Ba^{2+}**	**CG PET -2017**
The ionic species having the largest size is– **$Li^+(aq)$**	**CG PET -2017**
The increasing order of ionic size $Mg^{2+}, O^{2-}, Na^+, F^-, N^{3-}$ is – **$Mg^{2+} < Na^+ < F^- < O^{2-} < N^{3-}$**	**CG PET -2017**
The atom of largest size is– **Li**	**J & K CET-(2016)**
The pairs has the same size is– **Zr^{4+}, Hf^{4+}**	**COMEDK-2015**
Atomic radii metals are same is– **Cr, Mn, Cu**	**CG PET- 2015**
The increasing order of the atomic radius of Si, S, Na, Mg, Al is– **S < Si < Al < Mg < Na**	**AP-EAMCET (Engg.) - 2014**
The series of elements have nearly the same atomic radii is– **Fe, Co, Ni, Cu**	**JCECE - 2014**
Atomic number of Na = 11; Mg = 12; Al = 13. Among Na^+, Na, Mg, Mg^{2+} and Al^{3+}, the smallest and the biggest are respectively– **Al^{3+}; Na**	**SRMJEEE – 2013**
The order of atomic radius of Li, Be and B is– **Li > Be > B**	**AP EAMCET (Medical) - 2013**
The order of radius is– **$Ca^{2+} < Cl^- < S^{2-}$**	**WB-JEE-2012**
Among the elements Ca, Mg, P and Cl, the order of increasing radii is– **Cl < P < Mg < Ca**	**VITEEE- 2012**
The increasing order of the ionic radii of the given isoelectronic species is– **$Ca^{2+}, K^+, Cl^-, S^{2-}$**	**(AIEEE 2012)**
The largest in size is – **S^{2-}**	**J & K CET-(2011)**
The ion has lowest radius from the ions is– **Si^{4+}**	**JCECE - 2011**
The sets will have highest hydration enthalpy and highest ionic radius is–**Li and R**	AMU – 2010
The structure does $(NPCl_2)_4$ have is– **Cyclic**	AMU – 2010
The ions has the highest value of ionic radius is– **O^{2-}**	**BITSAT 2009**
Atomic radii of Ti, Zr and Hf vary– **Ti < Zr = Hf**	**CG PET -2009**
The atom of smallest atomic radius is– **Br**	**J & K CET-(2009)**
Al^{3+} has a lower ionic radius than Mg^{2+} because– **Al^{3+} has a higher nuclear charge than Mg^{2+}**	**SRMJEEE – 2007**
Increase in atomic size down the group is due to– **increase in number of electrons**	**UP CPMT-2007**
Atomic radii of F and Ne, in **Å,** are given by :– **0.72, 1.6**	**BCECE-2006**
The ionic radii (Å) of C^{4-} and O^{2-} respectively are 2.60 and 1.40. The ionic radius of the isoelectronic ion N^{3-} would be– **1.71**	**J & K CET-(2006)**
The most probable radius (in pm) for finding the electron in He^+ is– **26.5**	**AIIMS-2005**
The order for the size of Fe^{3+}, Fe and Fe^{2+} is– **$Fe^{3+} < Fe^{2+} < Fe$**	**AP-EAMCET (Engg.)-2004**
The ions has the highest value of ionic radius is– **O^{2-}**	**(AIEEE 2004)**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

The atomic size of cerium and promethium is quite close, due to:– **f-electrons have poor shielding effect**	**JCECE - 2004**
Consider the ions K^+, S^{2-}, Cl^- and Ca^{2+}. The order of radii of these ionic species are:– **$S^{2-} > Cl^- > K^+ > Ca^{2+}$**	**Kerala-CEE-2004**
The radius of hydrogen atom is 0.53Å. The radius of $_3Li^{2+}$ is of– **0.17Å**	**UP CPMT-2003**
The least ionic radius is– **I^{7+}**	**J & K CET-(2001)**
The metals Be, Mg, Ca and Sr of group 2 in the periodic table, the least ionic chloride will be formed by– **Be**	**J & K CET-(2000)**
O^{2-} and Si^{4+} are isoelectronic ions. If the ionic radius of O^{2-} is **1.4 Å,** the ionic radius of Si^{4+} will be– **0.41Å**	**A.P.EAMCET 1999**
The one with largest size is– **Cl^-**	**A.P.EAMCET 1997**
The pair of elements that have similar chemical properties are– **lithium and magnesium**	**A.P.EAMCET 1996**
If a neutral atoms is converted into a cation, then its– **size decreases**	**AIIMS-1996**
In the P^{3-}, S^{2-} and Cl^- ions, the increasing order of size is– **$Cl^- < S^{2-} < P^{3-}$**	**AIIMS-1996**
The radius of hydrogen atom in the ground state is 0.53 Å. The radius of Li^{2+} ion (atomic number = 3) in a similar state is– **0.17Å**	**NEET-1995**
The largest ion is– **O^{2-}**	**A.P.EAMCET 1994**
Kr nucleus has a ….. radius than that of Ba.– **Lesser**	**A.P.EAMCET 1992**
The does not represent the correct order of the property indicated is– **$Sc^{3+} > Cr^{3+} > Fe^{3+} > Mn^{3+}$ –ionicradii**	**VITEEE, 2014**
The order of electronegativeity is:– **F > O > Cl = N**	**CG PET-22.05.2022**
The electronegativity elements increases in the order– **Si, P, C, N**	**Kerala CEE-2018, Karnataka CET-2017 Assam CEE-2014, UPCPMT-2012 BITSAT 2005 J&K CET-1999**
Pauling's electronegativity values for elements are useful in predicting– **polarity of the molecules**	**BCECE-2011 UPTU/UPSEE-2004**
The indicates the correct variation in electronegativities is– **F > O > N > C**	**CG PET -2018 UPTU/UPSEE-2005**
Pauling's equation for determining the electronegativity of an element is– **$X_A - X_B = 0.208\sqrt{\Delta}$**	**J & K CET-(2006) UPTU/UPSEE-2010**
The not true for oxidation is– **removal of electronegative element**	**Kerala-CEE-29.08.2021**
The increasing order of the electronegativity is– **B < C < S < Cl**	**TS-EAMCET (Engg.), 05.08.2021 Shift-II**
The electronegativity order of the elements is– **N > I > S > Te**	**TS-EAMCET (Engg.), 07.08.2021 Shift-II**
Given that ionization potential and electron gain enthalpy of chlorine are 13 eV and 4 eV respectively. The electronegativity of chlorine on Mulliken scale approximately equals to– **3.0 eV**	**AP EAPCET 19-08-2021 Shift-I**
The electronegativity of the given elements increases in the order_____– **Si, P, C, N**	**AP EAPCET 20.08.2021 Shift-II**
The pair of elements has maximum electro negativity difference is– **Na & F**	AIIMS 26 May 2019 (Evening)
With respect to the Pauling electronegativity values of the elements is– **Ga < Ge**	**(JEE Main 2019, 11 Jan Shift-II)**

Search on TG: @apna_pdf

@apna_pdf

Two elements A and B have electronegativities 1.2 and 3.0 respectively. The nature of bond between A and B would be– **ionic**	**BITSAT 2017**
Among Me_3N, C_5H_5N and MeCN (Me = methyl group) the electronegativity of N is in the order– **MeCN > C_5H_5N > Me_3N**	**WB-JEE-2017**
The order of electronegativities of N, O, F and P is– **F > O > N > P**	**Karnataka-CET-2012**
The property of attracting electrons by the halogen atoms in a molecule is called– **electronegativity**	**JCECE - 2010**
The maximum electronegative is– **F**	**CG PET -2008**
The electronic configuration of most electronegative elements is– **$1s^2, 2s^2, 2p^5$**	**BCECE-2007**
The second most electronegative element is– **Oxygen**	**UP CPMT-2007**
The carbon is more electronegative as– **sp-hybridized carbon**	**Kerala-CEE-2004**
The represents the correct order of electronegativity is– **O > N > P**	**A.P.EAMCET 2002**
The most basic is – **F^-**	AMU 2002
In X – H ..... Y, X and Y both are electronegative elements. Then– **electron density on X will increase and on H will decrease**	**NEET-2001**
Let electronegativity, ionization energy and electron affinity be represented as EN, IP and EA respectively. The equation correct according to Mulliken is– **$EN = \frac{IP + EA}{2}$**	**A.P.EAMCET (Engg.)-2001**
The highest electronegativity is– **S (atomic number 16)**	**A.P.EAMCET 1995**
If the ionization energy and electron affinity of an element are 275 and 86 kcal mol^{-1} respectively, then electronegativity of the element on the Mulliken scale is– **2.8**	
Gadolinium has a low value of third ionisation enthalpy because of– **high exchange enthalpy**	**NEET-17.07.2022**
The order of electron gain enthalpies of Cl, F, Te and Po is:– **Po < Te < F < C*l***	**JEE Main-25.06.2022, Shift-II**
Elements X, Y and Z have atomic number 19, 37 and 55 respectively. **Y would have an ionization potential between those of X and Z**	**Karnataka CET-17.06.2022, Shift-II**
The ionisation potential element is highest as– **He**	**CG PET-22.05.2022**
The order of 2nd ionisation energy for the elements carbon, nitrogen, oxygen and fluorine is– **O > F > N > C**	**BCECE-2016 Assam CEE-2014 WB JEE-2010 UPTU/UPSEE-2004**
The set representing the correct order for first ionisation potential is– **Be > Mg > Ca**	**Tripura JEE-2019 Manipal-2017 JIPMER-2008 JCECE – 2007**
The order in which the first ionization potential increases is– **K, Na, Be**	**WB JEE-2015 MHT CET-2014 Karnataka CET, 2008**
The first ionization potential of Na, Mg and Si are respectively 496, 737 and 786 kJ mol^{-1}. The ionization potential of Al will be closer to– **575 kJ mol^{-1}**	**AMU-2014 CGPET-2010 J&K CET-2000**
The decreasing order of the ionization potential of elements is– **Ne > C*l* > P > S > Mg > A*l***	**JEE Main-27.07.2021, Shift-II BITSAT 2016, CG PET - 2005**
The arrangements, the order is NOT according to the property indicated against It– **B<C<N<O** **Increasing first ionization enthalpy**	**NEET-I, 2016 AIIMS-2015, 2005**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

The element with the highest ionization energy is– **[Ne] $3s^2$ $3p^3$**	**JIPMER-2010 JCECE - 2009 NEET-2009**
For the second period elements the correct increasing order of first ionization enthalpy is– **Li < B < Be < C < O < N < F < Ne**	**J & K CET-(2015) JEE Main-2013, NEET-2009**
The order of Ist ionisation energy is– **Li > Na > K**	**UPTU/UPSEE-2015 JIPMER-2006**
Generally, the first ionization energy increases along a period. But there are some exceptions. One which is not an exception is– **Na and Mg**	**KARNATAKA-CET, 2010 Karnataka-CET-2011**
The ionisation energy of C, N, O, F is– **C < O < N < F**	**KARNATAKA-CET, 2009 Karnataka-CET-2012**
The one electron species having ionization energy of 54.4 eV is:– **He^+**	**UPTU/UPSEE-2016 Kerala-CEE-2004**
The element has the highest first ionization potential is– **He**	**Manipal-2020 Kerala-CEE-2018**
The electronic configuration an atom has the lowest ionisation enthalpy- **$1s^2$ $2s^2$ $2p^6$ $3s^1$**	**WB JEE-2011 NEET-2007**
Proper decreasing order of first ionization potential of the elements Be, B, C and Li will be– **C > Be > B > Li**	**Tripura JEE-2022 JIPMER-2012**
The first ionisation potenital (in eV) of N and O atoms are– **14.6, 13.6**	**CG PET- 2016, 2013**
Four successive members of the first row transition elements are listed below with their atomic numbers. Expected to have the highest third ionisation enthalpy is– **Manganese (Z=25)**	**CG PET -2007 NEET-2005**
The second ionization enthalpies of Li, Be, B and C are in order– **Li >B>C>Be**	**CG PET -2017 J & K CET-(2011)**
The element has maximum first ionisation potential is– **He**	**CG PET- 2015 J&K CET-2001**
The increasing order of the first ionisation enthalpies of the elements B, P, S and F (lowest first) is– **B < S < P < F**	**UPTU/UPSEE-2017 (AIEEE 2006)**
A sudden large jump between the values of second and third ionization energies of elements would be associated with which of the following electronic configurations– **$1s^2$ $2s^2$ $2p^6$ $3s^2$**	**J & K CET-(2004), NEET-1993**
First ionisation potential of Be and B will be– **8.8 and 6.6**	**CG PET -2007 NEET-1998**
The order for ionization energy is correct is– **B < Be < C< O < N**	**AIIMS-2013 NEET-2001**
The order is correct for the first ionization energies of the elements is– **B < Be < O < N**	**VITEEE- 2009 JIPMER-2004**
The elements has the lowest ionisation potential is– **Cesium**	**AMU–2003 J & K CET-(2008)**
The first ionisation energy of magnesium is smaller as compared to that of elements X and Y, but higher than that of Z. The elements X, Y and Z, respectively, are– **argon, chlorine and sodium**	**(JEE Main 2021, 18 March Shift-II)**
The third ionisation enthalpy is highest in– **Alkaline earth metals**	**Kerala-CEE-29.08.2021**
The successive ionization energies of an element in kJ. mol^{-1} are 1060, 1900, 2920, 6280 and 21200. This element would belong to group-____– **V**	**AP- EAPCET- 07-09-2021, Shift-I**
Starting from the 1st, the successive ionization potentials of an element are respectively 5.98, 18.8, 28.4, 120.1, 154eV. The elements is– **Al**	**TS EAMCET 05.08.2021, Shift-I**
The first ionization energies (in kJ mol^{-1}) of four consecutive elements of the second period are given in the options. The first ionization energy of nitrogen is– **1402**	**TS EAMCET 04.08.2021, Shift-I**
If the successive ionization energies of an element A are 165, 190, 550 and 595 kcal. respectively. then the ground state electronic configuration of element A is _____.– **[Ne] $3s^2$**	**AP EAPCET 24.08.2021, Shift-I**

Search on TG: @apna_pdf

@apna_pdf

The first ionization enthalpies of Mg and Al can be expected to be_____– **IE_1 (Mg) = 737.7 kJ. mol^{-1}, IE_1 (Al) = 577.5 kJ. mol^{-1}**	**AP EAPCET 20.08.2021 Shift-II**
The second ionisation energies of Li, Be, B and C are in the order ..... .– **Li > B > C > Be**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
The element of the 3d-series has highest third ionisation enthalpy is– **Zn**	**AP EAMCET (Engg.) 21.09.2020, Shift-II**
The first and second ionisation enthalpies of a metal are 496 and 4560 kJ mol^{-1}, respectively. How many moles of HCl and H_2SO_4, respectively, will be needed to react completely with 1 mole of the metal hydroxide?– **1 and 0.5**	**(JEE Main 2020, 9 Jan Shift-II)**
The first ionisation energy (in kJ/mol) of Na, Mg, Al and Si respectively, are:– **496, 737, 577, 786**	**(JEE Main 2020, 8 Jan Shift-I)**
The third ionisation enthalpy is minimum for:– **Fe**	**(JEE Main 2020, 8 Jan Shift-I)**
In comparison to boron, beryllium has– **lesser nuclear charge and greater first ionisation enthalpy**	**(JEE Main 2019, 12 April Shift-II)**
The element having greater difference between its first and second ionization energies, is:– **K**	**(JEE Main 2019, 9 April Shift-I) AIIMS 25 May 2019 (Morning)**
The first ionization enthalpy of the elements are in the order:– **Si < P < C < N**	**Karnataka-CET-2019**
The highest second ionisation energy is:– **Chromium**	**Manipal-2019**
The second ionisation energy of elements the order– **Zn > Cd > Hg**	**WB-JEE-2019**
The successive ionization energies in kJ/mol of an element P are 740, 1500, 7000, 10500, 13600, 18000 and 21700. Ion is the most likely to be formed when P reacts with chloride as– **p^{2+}**	**COMEDK 2018**
The elements with electronic configurations, them may have the highest ionization energy is– **Ne [$3s^2 3p^3$]**	**BITSAT 2018**
The ionization energy of Be atom. Consider the first ionization energy of H atom as 13.6 eV.– **–217.6 eV**	**J & K CET-(2018)**
The ionisation energy of nitrogen is larger than that of oxygen because: **half-filled p-orbitals of nitrogen have extra stability**	**Manipal-2017**
The first four ionization enthalpy values of an element are 191 kcal mol^{-1}, 578 kcal mol^{-1}, 872 kcal mol^{-1} and 5962 kcal mol^{-1}. The number of valence electrons in the element is– **3**	**CG PET -2017**
First and second ionisation enthalpies of Mg are 737.76 and 1450.73 J mol^{-1} respectively. The energy required to convert all the atoms of magnesium to magnesium ions present in 24g of magnesium vapours is– **2.188 kJ**	**CG PET- 2016**
Elements have relatively high ionisation energy and occur as sulphides are– **metalloids**	**SRMJEEE-2016**
The decreasing order of first ionisation enthalpies of five elements of the second period is– **F > N > C > Be > B**	**AIIMS-2016**
The second ionisation enthalpy of which of the following alkaline earth metals is the highest as– **Be**	**Kerala-CEE-2016**
The atoms has the highest first ionisation energy is– **Sc**	**(JEE Main 2016)**
The ionization energy of hydrogen atom in the ground state is– **13.6 eV**	**NDA (II)-2017**
The order of first ionization enthalpies of the elements is– **Be > Mg > Ca > Sr > Ra > Ba**	**Kerala-CEE-2015**

TEAM SPY

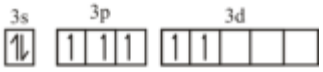
Search on TG: @apna_pdf

@apna_pdf

Atomic numbers of vanadium, chromium, nickel and iron are 23, 24, 28 and 26 respectively. These is expected to have the highest second ionization enthalpy is– **Cr**	**COMEDK 2014**
Ionization energy and electron affinity are defined at– **absolute zero**	**J & K CET-(2014)**
The order of ionization energies is– **Au > Cu > Ag**	**UPTU/UPSEE-2013**
When the first ionization energies are plotted against atomic number, the peaks are occupied by– **Rare gases**	**BITSAT 2013**
The order of increasing first ionization enthalpy for Ca, Ba, S, Se and Ar is– **Ba < Ca < Se < S < Ar**	**(JEE Main 2013)**
The elements has highest ionisation potential is– **N**	**MPPET - 2012**
The atomic number of the element with highest ionization energy is– **Z= 15**	**COMEDK 2012**
The elements of highest first ionization enthalpy is– **Ne**	**Kerala-CEE-2012**
If the first ionization energy of H atom is 13.6 eV, then the second ionization energy of He atom is– **54.4 eV**	**WB-JEE-2012**
The electronic configuration corresponds to the highest value of ionisation potential is– **$1s^2$**	**UP CPMT-2012**
On adding $AlCl_3$ to water– **the ionisation of water increases**	**UP CPMT-2011**
The K, I, Cl and Li will display the highest first ionisation energy is– **Cl**	**UPTU/UPSEE-2011**
The decreasing order of first ionisation enthalpies of five elements of the second period is– **F > N > C > Be > B**	**Kerala-CEE-2011**
The order of second ionisation potential of Na, Ne, Mg and Al is– **Mg < Al < Ne < Na**	**AP-EAMCET- (Engg.)-2011**
Element is expected to have lowest first ionization energy is– **Sr**	**J & K CET-(2010)**
The statement is correct about ionization potential– **It decreases with an increased in atomic radii.**	**AIIMS-2010**
The order for the first ionisation energies of the elements is– **B < Be < O < N**	**AP EAMCET (Engg.)-2009**
The pair of elements having approximately equal ionization potential is– **Al, Ga**	**UPTU/UPSEE-2009**
The first ionization potential of Al, as compared to that of Mg is :– **Lower**	**BITSAT 2008**
The first ionization energy of oxygen is less than that of nitrogen. The correct reason for this observation is– **Greater effective nuclear charge of oxygen than nitrogen**	**Kerala-CEE-2008**
The order of decreasing second ionization enthalpy of Ti (22), V(23), Cr (24) and Mn (25) is– **Cr > Mn > V > Ti**	**(NEET-2008)**
The comparatively high b.pt. of HF is due to– **formation of hydrogen bonds and consequent association**	**MHT CET-2007**
Highest ionizing power is exhibited by– **α-rays**	**UP CPMT-2007**
Ionisation energy decreases down the group due to– **increase in atomic size**	**UP CPMT-2007**
The has lowest ionization energy is– **Sulphur**	**UP CPMT-2007**
First inonisation potential is highest for– **Mg**	**CG PET -2006**
Element having maximum ionization energy– **Li**	**UP CPMT-2005**
The order of first ionization energies of the elements Li, Be, B, Na is:– **Be > B > Li > Na**	**Kerala-CEE-2005**
The elements have lowest value of IE_1 is– **Sn**	**UP CPMT-2004**
The first ionisation potential is maximum for– **N**	**UP CPMT-2004**

Search on TG: @apna_pdf

@apna_pdf

Ionisation depends upon– **Dilution**	**UP CPMT-2004**
The energy of last element of Li will be:– **–30.6 eV**	**JCECE - 2004**
The has maximum ionization energy is– **Fluorine**	**JCECE - 2004**
The is a favourable factor for cation formation is– **Low ionization potential**	**A.P.EAMCET 2004**
The highest first ionisation potential is of:– **nitrogen**	**BCECE-2004**
The atomic numbers of vanadium (V), chromium (Cr), manganese (Mn) and iron (Fe) are, respectively 23, 24, 25 and 26. For the expected second highest ionisation enthalpy is– **Cr**	**(AIEEE 2003)**
The has maximum energy is– 	**AIIMS-2002**
The order of decreasing first ionization potential is– **Ca > K > Rb > Cs**	**UP CPMT-2001**
Sodium forms Na^+ ion but it does not form Na^{2+} because of– **low value of I^{st}. I.E. and high value of II^{nd} I.E.**	**AIIMS-2001**
Ionic radius (in Å) of As^{3+}, Sb^{3+} and Bi^{3+} follow the order– **$Bi^{3+} > Sb^{3+} > As^{3+}$**	**A.P.EAMCET 2001**
The electronic configuration of elements A, B, and C are [He] $2s^1$, [Ne] $3s^1$ and [Ar] $4s^1$ respectively, the order is correct for the first ionization potentials (in kJ mol^{-1}) of A, B and C as– **A > B > C**	**A.P.EAMCET 2001**
The electronic configuration of elements A, B and C are [He]$2s^1$, [Ne]$3s^1$ and [Ar]$4s^1$ respectively, the protentials is correct for the first ionization potentials (in KJ mol^{-1}) of A, B and C as– **A > B > C**	**AP EAMCET (Engg.) 2001**
The element has the highest first IP is– **P**	**A.P.EAMCET 2000**
The species has the highest ionization potential is– **Li^+**	**A.P.EAMCET 1998**
The element has the highest first ionization potential is– **Nitrogen**	**AP EAMCET (Medical) - 1998**
The element first ionisation potential is maximum for:– **Hydrogen**	**AIIMS-1998**
The statement in respect of an element in a particular group of the periodic table is– **An increase in nuclear charge causes an increase in ionization energy.**	**J & K CET-(1997)**
The order of decreases in atomic radii for Be, Na, and Mg is– **Na > Mg > Be**	**A.P.EAMCET 1995**
EN of an atom is given by the average of EA and …..– **Ionization energy**	**A.P.EAMCET 1992**
Ionisation potential of 1s electron is ….. than that of 2s electron in the same atom.– **Greater**	**A.P.EAMCET 1992**
Al^{3+} ion has a lower ionic radius than Mg^{2+} ion because– **Al^{3+} has a higher nuclear charge than Mg^{2+}**	**A.P.EAMCET 1992**
Among the alkali metals, the metal with the highest ionisation potential is– **Li**	**A.P.EAMCET 1991**
The halogen has maximum electron affinity is– **Chlorine**	**UP CPMT-2010 BCECE-2007, UP CPMT-2007 JIPMER-2006, UPTU/UPSEE-2015, 2006 NEET-1999**
The order of electron affinity of F, Cl, Br and I is– **C*l* > F > Br > I**	**UPTU/UPSEE-2016 J&K CET-2012, 2008 CG PET -2009 AMU–2003 JCECE – 2003**
	UPTU/UPSEE-2014, 2007 UP CPMT-2013, BITSAT-2014

JEM SIR

Search on TG: @apna_pdf

@apna_pdf

The order of electron affinity is– **O > C > B > N**	**J & K CET-(2005)** **Assam CEE-2014**
Born-Haber cycle can be used to estimate– **electron affintiy**	**UPTU/UPSEE-2010, 2008**
The ionic species has the greatest proton affinity to form stable compound is – **NH^-_2**	**BCECE-2012** **NEET-2007**
The electron affinity of Be is similar to– **He**	**UP CPMT-2002** **Manipal-2018**
Electron affinity is positive when– **$O^{2-}$is formed from O^-**	**CG PET- 2013** **BCECE-2006**
The elements has the highest value of electron affinity is– **S**	**J & K CET-2016, 2012** **BCECE-2010**
The value of electron gain enthalpy of Na^+ if IE_1 of Na = 5.1 eV is– **–5.1 eV**	**VITEEE- 2012** **NEET-2011**
The order of electron gain enthalpy with negative sign of F, Cl, Br and I, having atomic number 9, 17, 35 and 53 respectively, is– **Cl > F > Br > I**	**JEE Main-07.01.2020, Shift-I** **(AIEEE 2011)**
The element with highest electron gain enthalpy is– **Ne**	**TS-EAMCET (Engg.), 07.08.2021 Shift-II**
The atoms should have the highest I^{st} electron affinity is– **F**	**WB-JEE-2017**
The F_2 strongest oxidizing agent (among halogens) although electron affinity of Cl_2 is higher than F_2 is– **Low enthalpy of dissociation and high free energy of hydration**	**J & K CET-(2017)**
Among P, S, Cl, F, the elements with most negative and least negative electron gain enthalpy respectively are– **Cl, P**	**J & K CET-(2015)**
Electron gain enthalpy with negative sign of fluorine is less than that of chlorine due to– **smaller size of fluorine atom**	**JCECE - 2015**
Copper is extracted from copper pyrites by heating in a Bessemer converter. The method is based on the principle that– **copper has more affinity for oxygen than sulphur at high temperature**	**Karnataka-CET-2015**
The does electron affinity change when we move from left to right in a period in the periodic table is– **It increases**	**J & K CET-(2013)**
The arrangement represents the correct order of least negative to most negative electron gain enthalpy for C, Ca, Al, F and O is– **Ca < Al < C < O < F**	**Karnataka NEET-2013**
The electron affinity values of elements A, B, C and D are respectively –135, –60, –200 and –348 kJ mol^{-1}. The outer electronic configuration of element B is– **$3s^2 3p^3$**	AP-EAMCET- (Engg.) - 2010
Carbon can reduce ferric oxide to iron at a temperature above 983 K because– **carbon has a higher affinity towards oxidation than iron**	**KARNATAKA-CET, 2010**
The favourable factor for cation formation is– **Low ionisation potential**	**AP-EAMCET (Engg.)-2005**
The lowest electron affinity is– **I**	**J & K CET-(2005)**
The electron affinity values (in kJ mol^{-1}) of three halogens X, Y and Z are respectively –349, –333 and –325. Then X, Y and Z respectively are:– **Cl_2, F_2 and Br_2**	**AP-EAMCET (Medical), 2003**
The reagents is used for detection of unsaturation in alkenes as– **Cold dilute alkaline $KMnO_4$**	**AP-EAMCET (Medical), 2003**
The definition of electron-affinity is– $X_{(g)} \xrightarrow{+e} X^-_{(g)}$	**J & K CET-(2001)**

TEACHOO

Search on TG: @apna_pdf

@apna_pdf

11. Chemical Bonding and Molecular Structure

Covalent Bond and Ionic or Electrovalent Bond

- In an ionic compound A^+X^-, the degree of covalent bonding is greater when– **A^+ is small and X^- is large**
- The highest ionic character is – **$BaCl_2$**
- The number of π-bonds in the structure given below are: $(NC)_2\ C = C\ (CN)_2$– **9**
- The molecule that deviates from octed rule is–**$BeCl_2$**
- The formal charge on O-atom in carbonate ion is– **+1**
- The molecule is having complete octet is– **$BeCl_2$(s)**
- Compound has electrovalent linkage– **NaCl**
- $SnCl_4$ is a covalent liquid because– **Electron clouds of the Cl^- ions are strongly polarized to envelop the cation**
- The increasing order of covalent character is– **$LiCl < BeCl_2 < BCl_3 < CCl_4$**
- The number of electrons involved in the bond formation of N_2 molecule– **6**
- The ..... will have directional character– **Both covalent & coordinate bond**
- The bonds present in N_2O_5 are– **Covalent & coordinate**
- The ..... contains a coordinate covalent bond– **$N_2H_5^+$**
- Two elements P and Q combine to form a compound. If P has 2 and Q has 6 electrons in their outermost shell, formula of the compound formed will be– **PQ**
- A pair of electrons present between two identical non-metals is shared – **equally between them**
- Equal sharing of electrons between two atoms takes place in - **Covalent bond formation**
- A pair of electrons is contributed by one atom and shared by both the atoms during formation of a/an- **Coordinate bond**
- Type of bond H_2SO_4 molecules contains is/are- **Covalent and coordinate bonds**
- The Lewis dot formula for CO_2– **$:\ddot{O}::C::\ddot{O}:$**
- The types of bonds present in NH_4^+ are- **Three covalent bonds and one coordinate bond**
- The ..... substance has giant covalent structure– **Silica**
- The ..... pairs CO_2 resembles– **$HgCl_2$, C_2H_2**
- Silicon has 4 electrons in the outermost orbit. In forming the bonds– **It shares electrons**
- When two hydrogen atoms bond with each others– **Potential energy is lowered**
- A bond with maximum covalent character between nonmetallic elements is formed– **Between identical atoms**
- Indicate the nature of bonding in CCl_4 and CaH_2– **Covalent in CCl_4 and electrovalent in CaH_2**
- A covalent bond is likely to be formed between two elements which– **Have similar electronegativities**
- As compared to covalent compounds, electrovalent compounds generally have–**High melting points and high boiling points**
- The interatomic distance in H_2 and Cl_2 molecules are 74 and 198 pm respectively. The bond length of HCl is– **136 pm**
- A covalent bond between two atoms is formed by– **Electron sharing**
- ..... pairs of elements forms a compound with maximum ionic character– **Cs and F**
- An ionic bond $A^+\ B^-$ is most likely to be formed when– **The ionization energy of A is low and the electron affinity of B is high**
- Bonds present in $CuSO_4.5H_2O$ is– **Electrovalent, covalent, H-bonding and coordinate**
- Electrovalent compounds or ionic compounds do not show stereoisomerism. The reason is– **Non-directional nature of ionic bond**
- The high melting point and insolubility in organic solvents of sulphanilic acid are due to its ..... structure– **Bipolar ionic**
- The compounds has a maximum value of lattice energy– **NaF**
- The chloride has considerable covalent character is - **LiCl**
- An ionic bond A^+B^- is most likely to be formed when– **The ionization energy of A is high and the electron affinity of B is high**

TEAMSPY

Search on TG: @apna_pdf

@apna_pdf

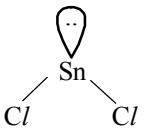
- Molecule having maximum number of covalent bonds is– **$Co(NH_2)_2$**
- Number of bonded electrons in ethane molecule are– **14**
- The number of electron pairs involved in the formation of hydrogen cyanide molecule are– **Four**
- The electronegativities of two elements are 0.7 and 3.0. The bond formed between them would be– **Ionic**
- Highly ionic compound is formed by the combination of elements belonging to– **I A group and VII A group**
- Potassium forms a highly ionic compound when it combines with– **Fluorine**
- Most ionic compound is– **Sodium fluoride**
- Both polar and non-polar bonds– **H_2O_2**
- The non-polar is – **Cl_2**
- Covalent molecules are usually held in a crystal structure by– **Van-der Waal's attraction**
- The total number of electrons in the correct Lewis dot formula of the sulphite ion– **26**
- Indicate the nature of bonding in diamond– **Covalent**

Bond Parameters

- The angle around the central atom is exactly equal to 109°28'– **NH_4^+**
- The bond angle in H_2S is– **> H_2Se, < H_2O**
- The largest bond angle around the central atom will be present in– **BeF_2**
- Lattice energy of an ionic compound depends upon– **Charge on the ion and size on the ion**
- Based on lattice energy and other considerations, the alkali metal chlorides is expected to have the highest melting point– **NaCl**
- In the Born-Haber cycle for the formation of solid common salt (NaCl), the largest contribution comes from– **The lattice energy**
- Least melting point is shown by the compound– **$SnCl_4$**
- The decreasing order of polarizability ion is– I^-, Br^-, Cl^-, F^-
- The M.P. of $SnCl_4$ is less than of $SnCl_2$, the suitable reason for the observed fact is– **Ionic potential (ϕ) of Sn^{+4} is high**
- The molecule has shortest C–H bond is – **Ethyne**
- The sequence of decrease in the bond angles of the hydrides is– **$PH_3 > NH_3 > AsH_3 > SbH_3$**
- In O_3, there are– **2σ, 1π bonds**
- Bond angle in water is– **104.5°**
- The order in the O–O bond length increaes in the– **$O_2 < O_3 < H_2O_2$**
- The ONO angle is maximum in– **NO_2^+**
- The order of bond length is – **$NO_2^+ < NO_2^-$**
- The order towards bond angle is– **$sp^3 < sp^2 < sp$**
- Resonance is not shown by– **SiO_2**
- H_2O is dipolar, whereas BeF_2 is not. It is because– **H_2O is angular and BeF_2 is linear**
- The bond length of the S–O bond is maximum in compound is $SOBr_2$, $SOCl_2$, SOF_2– **$SOBr_2$**
- The order of dipole moment is– **$CH_4 < NF_3 < NH_3 < H_2O$**
- The maximum number of identical angle is CH_2F_2 molecule– **4**
- The bond angle is maximum is – **NH_4^+**
- The compounds has the smallest bond angle in its molecule – **SH_2**
- The correct order of bond angles (smallest first) in, H_2S, NH_3, BF_3 and SiH_4 is– **$H_2S < NH_3 < SiH_4 < BF_3$**
- The bonds has the highest average bond energy– **N ≡ N**
- The correct decreasing order of bond angles is– **$BF_3 > NF_3 > PF_3 > ClF_3$**
- H – B – H bond angle in BH_4^- is– **109°**

VSEPR Theory

- The predicted geometry of TeF_4 by VSEPR theory is– **Trigonal bipyramidal**
- The three molecules XeF_4, SF_4, SiF_4 one have tetrahedral structure is– **Only SiF_4**
- The atomic number of Sn is 50. The shape of gaseous $SnCl_2$ molecule is–



- The shape of SO_4^{2-} ion is– **Tetrahedral**
- The ..... species the angle around the central atom is exactly equal to 109°28'– **NH_4^+**
- The order of bond angles (smallest first) in H_2S, NH_3, BF_3 and SiH_4 is– **$H_2S < NH_3 < SiH_4 < BF_3$**
- The geometry of $XeOF_4$ by VSEPR theory is– **Square pyramidal**
- The species CH_3^+ has a trigonal planar shape which is– **Trigonal Planar**
- The pair of compounds having identical shapes for their molecules is– **XeF_2, $ZnCl_2$**

Search on TG: @apna_pdf
@apna_pdf

- The paramagnetic behaviour of B_2 is due to the presence of– **2 unpaired electrons in π MO**
- When two ice blocks are pressed together, it forms a single block of ice due to– **H-bonding**
- The hydrogen bonds are encountered in HF, H_2O, NH_3 and HF_2^-. The relative order of energies of hydrogen bonds is– **$HF_2^- > HF > H_2O > NH_3$**
- The geometrical arrangement and shape of I_3^- are respectively– **Trigonal bipyramidal geometry, linear shape**
- The ..... set contains species having same angle around the central atom– **BF_3, BCl_3, BBr_3**
- The molecule that has linear structure is– **CO_2**
- Shape of a molecule having 4 bond pairs and two lone pairs of electrons, will be– **Square planar**
- The molecule has regular geometry– **SF_6**
- The shapes of XeF_4, XeF_3^-, ClO_3^-, BO_3^{3-} and SO_3^{2-} the non-planar species are– **XeO_3, ClO_3, SO_3^{2-}, AsO_3^{3-}**
- In the ..... molecule/ion all the bonds are equal– **SiF_4**
- The species having pyramidal shape is– **OsF_2**
- Total number of lone pair of electrons in I_3^- ion is– **9**
- The ..... pairs of ion is isoelectronic and isostructural– **CO_3^{2-}, NO_3^-, ClO_3^-, SO_3^{2-}**
- The angle is most influenced by the presence of lone pair in SF_4– **Equatorial angle**
- The shape of CO_2 molecule is similar to– **BeF_2**
- Out of $CHCl_3$, CH_4 and SF_4, the molecules having regular geometry are– **CH_4 only**
- The regular tetrahedral structure is – **BF_4^-**
- The shape of formaldehyde molecule as per the VSEPR theory is– **Trigonal Planar**
- The pair contains iso-structural species is – **SO_4^{2-} and BF_4^-**
- The interhalogen compound that cannot exist is– **IBr_3**
- The molecule ML_x is planar with six pair of electron around M in the valence shell. The value of x is– **4**
- Cyanogen, $(CN)_2$, has a _____ shape/structure– **Linear**
- The geometry of electron pairs around I in IF_5 is– **Square Pyramidal**
- The tetra atomic species is non-polar and planar– **BF_3**
- The species have shape similar to $XeOF_4$?– **XeF_5^+**
- The total number of lone pairs of electrons in NO_3^- – **8**
- According to VSEPR theory– **The pair of electrons trend to occupy such positions that minimise repulsions.**
- In PO_4^{3-} ion, number of bond pairs and lone pairs of electrons on Phosphorus atom are– **5, 0**
- In OF_2 molecule, the total number of bond pairs and lone pairs of electrons are respectively– **2, 8**
- The shape of $XeOF_2$ on the basis of VSEPR theory is– **T-shaped**
- The pyramidal species is a – **H_3O^+**
- In CCl_4, the four valencies of carbon are directed towards the corners of a– **Tetrahedron**

Valence Bond Theory & Hybridisation

- BrO_3^- is iso-structural with- **XeO_3**
- A hybrid orbital formed from s and p-orbital can contribute to– **σ-bond only**
- The hybrid state of C in CS_2 should be– **sp**
- The central atom does not use sp^3 hybrid orbitals in its bonding– **BeF_3**
- The compound 1, 2-butadiene has– **sp, sp^2 and sp^3 hybridized carbon atoms.**
- The molecules like BrF_5 and $XeOF_4$ are square pyramidal in shape. the type of hybridisation shown in these molecules is– **sp^3d^2**
- CF_4, SF_4 and XeF_4 contain lone pair on their central atoms. Number of lone pairs are – **0, 1 and 2 lone pairs of electrons respectively**
- The hybrid state of carbon in ethyne, graphite and diamond are respectively– **sp, sp^2, sp^3**
- Order of size of sp, sp^2 and sp^3 orbitals is– **$sp < sp^2 < sp^3$**
- The ground state electronic configuration of S is $3s^2 3p^4$. How does it form the compound SF_6– **Due to presence of vacant 3d-orbitals which provide 6 unpaired electrons in excited state**
- 2s and 2p-atomic orbitals combine to give how many molecular orbitals– **8**
- The types of hybrid orbitals of nitrogen in NO_2^+, , NO_3^- and NH_4^+ respectively are expected to be– **sp, sp^2 and sp^3**
- In NO_3^- ion, the number of bond pairs and lone pairs of electrons on nitrogen atom are– **4, 0**
- The angle that corresponds to sp^2 hybridisation is– **120^0**
- The electronic configuration of the outermost shell of the most electronegative element is– **$2s^2 2p^5$**
- The hybridisation of ICl_2^+ is– **sp^3**
- The state of hybridization of central atom in dimer of BH_3 and BeH_2 is– **sp^3, sp^2**
- The ..... pairs, the hybridization of the central atoms is same– **NH_3, CH_4**

TEAM SPY

Search on TG: @apna_pdf
@apna_pdf

- The ..... pairs is isostructural (i.e. having the same shape and hybridization)– **$[BF_4^-$ and $NH_4^+]$**
- The ion that is isoelectronic with CO and having same bond order is– **CN^-**
- The ..... has fractional bond order– **H_2^-**
- In PO_4^{3-}, the formal charge on each oxygen atom and the P-O bond order respectively are– **–0.75, 1.25**
- The pair of species with the same bond order is– **O_2^{2+}, B_2**
- Assuming that Hund's rule is violated, the bond order and magnetic nature of the diatomic molecule B_2 is– **1 and diamagnetic**
- The ..... molecule have dipole moment– **BF_3**
- The dipole moment of NH_3 is– **Higher than dipole moment of NCl_3**
- Dipole moment is shown by– **Cis 1, 2 – dichloro ethene**
- Dipole moment is highest in– **CHF_3**
- Species having zero dipole moment– **XeF_4**
- The boiling point of CCl_4 is higher than that of $CHCl_3$ because– **CCl_4 has more number of polarisable electron resulting in the strong Vander Waal's force of attraction that of $CHCl_3$**
- The molecule has the maximum dipole moment– **NH_3**
- The hybridisation scheme for the central atom includes a d-orbital contribution in– **I_3^-**
- The triple bond in N_2 molecules consists of– **One sigma and two π bonds**
- Triple bond in ethyne is formed from– **One sigma and two pi bonds**
- The bond in the formation of fluorine molecule will be– **Due to p-p overlapping**
- ..... type of overlapping results the formation of a π-bond– **Lateral overlapping of p-p orbitals**
- In a double bond connecting two atoms, there is a sharing of– **4 electrons**
- π bond is formed– **By sidewise overlapping of half filled p-orbitals**
- Strongest bond formed, when atomic orbitals undergo– **A sigma bond is weaker than π bond**
- The strength of bonds by s-s, p-p, s-p overlap in the order of– **s-s < s-p < p-p**
- The ..... orbitals can form π-bond, if internuclear axis is y-axis– **$p_x + d_{xy}$, $d_{yz} + d_{yx}$**
- CO_2 is a gas, while SiO_2 is a solid both are– **Acidic**
- The ..... molecule, bonding is not taking place in excited state– **PCl_5**
- All the four sigma bonds in perchlorate ion are formed by orbital– **sp^3**
- The conversions involve change in both hybridisation and shape – **$BF_3 \rightarrow BF_4^-$**
- The bond angle and hybridization in ether (CH_3OCH_3) is– **> 109° 28' sp^3**
- Hybrid orbital having maximum p-characer is– **sp^3**
- The central atom does not have sp^3 hybridisation is – **SF_4**
- Hybridisation of C in CO_3^{2-} – **sp^2**
- Hybridisation of iodine in iodine hepta fluoride molecule is– **sp^3d^3**
- The molecule contains sp^3d^2 and p orbitals overlapping in it is– **BrF_5**
- Hybridisation of central atom is sp^2 in– **NO_3^-**
- The type of hybrid orbital used by the oxygen atom in Cl_2O molecule is– **sp^3**
- The type of overlapping results in the formation of a π bond– **Lateral overlapping of p–p orbitals**
- Indicate the wrong statement according to Valence bond theory– **p-orbitals always have only sidewise orverlapping**
- The strongest P–O bond is found in the molecule– **F_3PO**
- The order of hybridization of the central atom in the species are – **sp^3, sp^3d, sp^3d, sp**
- The hybridization of Te in $TeCl_6$ – **sp^3d^2**
- The hybridisation of the central atom will change when– **H_3BO_3 combines with OH**
- The state of hybridisation of anionic part of solid N_2O_5 – **sp^2**
- $BF_3 + F^- \rightarrow BF_4$
  The hybridisation state of B in BF_3 and BF_4^- ?
  – **sp^2, sp^3**
- Propyne molecule contains– **6 sigma and 2 pi bonds**
- sp^3d hybridization is considered to be a combination of two hybridization. They are– **$sp^2 + pd$**
- The X-axis as the internuclear axis, a sigma bond will not be formed in– **$2p_y$ and $2p_y$**
- On hybridisation of one 's' and one 'p' orbitals we get– **Two orbitals at 180°**
- s-p overlapping is present in– **HF**
- The hybridization of atomic orbitals of nitrogen in NO_2^+, NO_3^- and NH_4^+ are– **sp, sp^2 and sp^3 respectively**
- The 'S' atom among that does not have sp^3 hybridization is– **SF_4**

Molecular Orbital Theory

- The number of antibonding electron pairs in O_2^{2-} molecular ion on the basis of molecular orbital theory is (at no. O = 8)– **4**

Search on TG: @apna_pdf
@apna_pdf

- The ..... pairs of species have the same bond order– **CN^-, CO**
- The ..... represents the bond order– **$O_2^- < O_2^+ < O_2^{2+}$**
- The pair of species that has the same bond order is– **CO, NO^+**
- Bond order of 1.5 is shown by– **O_2^-**
- The electronic configuration of carbon is $1s^2\ 2s^2\ 2p^2$. There are 12 electrons in C_2. The correct electronic configuration of C_2 molecule is– **$(\sigma 1s^2)(\sigma^* 1s^2)(\sigma 2s^2)(\sigma^* 2s^2)(\pi 2p_x^2 = \pi 2p_y^2)$**
- The order of stability of N_2 and its ions is– **$N_2 > N_2^+ = N_2^- > N_2^{2-}$**
- The species having bond order different from that in CO is– **NO**
- The molecules/ions does not contain unpaired electrons is – **C_2, He_2**
- The species does not exist under normal conditions is– **Be_2**
- The paramagnetic is – **NO, NO^-**
- The shape and I – I – I bond angles respectively in I_3^- ion are– **Linear; 180^0**
- Number of lone pair(s) of electrons on central atom and the shape of BrF_3 molecule respectively, are– **2, bent T-shape**
- The bond order and magnetic behaviour of O_2^- ion are respectively– **1.5 and paramagnetic**
- Of the species, NO, NO^+, NO^{2+} and NO^-, the one with minimum bond strength is– **NO^-**
- The formal charge on each oxygen atom in CO_3^{2-} ion is– **–0.67**
- The dipole moments of CCl_4, $CHCl_3$ and CH_4 are in the order– **$CH_4 = CCl_4 < CHCl_3$**
- The strong O–O bond is– **O_2^+**
- The two species have identical bond order – **N_2^-, O_2^+**
- How many bonds does B_2 have– **1**
- The smallest bond length– **O_2^+**
- The diamagnetic is- **Li_2**
- Molecular orbital theory was given by– **Mulliken**
- Molecular orbital electronic configuration for 'X' anion is- KK $\sigma 2s^2 \sigma^* 2s^2 \pi 2p_x^2\ \pi 2p_y^2 \sigma 2p_z^2 \pi^* 2p_x^1$, the anion 'X' is.– **$N_2^-$**
- The number of anti-bonding electrons pairs in O_2^{2-} molecular ion on the basis of molecular orbital theory is (atomic no. of O is 8)– **4**
- The paramagnetic with bond order 0.5– **H_2**
- The pairs have identical bond order is – **N_2, O_2^{2-}**
- The bond order of O_2^- is– **1.5**
- The molecule having bond order 3 is– **N_2**
- The values of bond orders will be 2.5– **O_2^+, NO, NO^{2+}, CN**
- The species is paramagnetic is – **NO**
- The ionization processes, the bond order has incresed and the magnetic behaviour has changed– **$NO \rightarrow NO^+$**
- The molecular electronic configuration of H_2^- ion is– **$(\sigma 1s)^2(\sigma^* 1s)^1$**
- The bond order is an indication of existence of a molecule– **Positive bond order**
- Paramagnetism is shown by the molecules which have– **Unpaired electrons**
- Total number of orbitals singly occupied in O_2 molecule– **2**
- Oxygen molecule is paramagnetic because– **Presence of unpaired electrons in antibonding molecular orbitals**
- Hydrogen bond between two atoms is formed due to– **Displacement of electrons towards more electronegative atom resulting in fractional positive charge on hydrogen**
- Though covalent in nature, methanol is soluble in water, because– **Due to hydrogen bonding between methanol and water molecules**
- The ice floats on water because– **It has open cage like structure in which lesser molecules are packed per mL than water**
- Combination of two atomic orbitals results in the formation of two moleular orbitals an _____– **One bonding and one anti-bonding orbital**

Hydrogen Bonding

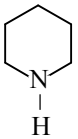
- Maximum number of H-bonds in one molecule of water is– **4**
- H-bond is not present in– **Hydrogen sulphide**
- Glycerol is more viscous than glycol the reason is– **More hydrogen bonding**
- Acetic acid exists as dimer in benzene due to– **Presence of carboxyl group**
- Density of ice is less than that of water because of– **Open porous structure of ice due to hydrogen bonding**
- The boiling point of p-nitrophenol is higher than that of o-nitrophenol because–**There is intermolecular hydrogen bonding in p-nitrophenol**
- o-nitrophenol can be easily steam distilled whereas p-nitrophenol cannot be, because of– **Intramolecular hydrogen bonding in o-nitrophenol**
- In solid argon the atoms are held together– **By Vander-waal's forces**

TEAM SPY

Search on TG: @apna_pdf

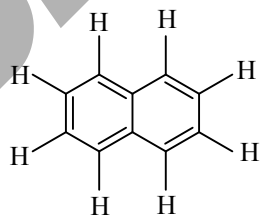
@apna_pdf

- Covalent molecules are usually held in a crystal structure by– **Vander Waal's attraction**
- The intermolecular force in hydrogen fluoride is due to– **Hydrogen bond**
- The ..... compound shows the presence of intermolecular hydrogen bond– **Cellulose**
- ..... is the dominant intermolecular force bond that must be overcome in converting liquid CH_3OH to a gas– **Hydrogen bonding**
- The intermolecular interaction that is depends on the inverse cube of distance between the molecule is– **Ion-dipole interaction**
- Hydrogen bonding plays a central role in– **Ice floats in water, Higher Lewis basicity of primary amines the tertiary amines in aqueous solutions, Dimerisation of acetic acid in benzene**
- The compound has strongest hydrogen bonding is – **Ethyl alcohol**
- High boiling point of water is due to– **Hydrogen Bonding**
- The dominant intermolecular force or bond that must be overcome in converting liquid CH_3OH to a gas– **Hydrogen bonding**
- The least volatile– **H_2O**
- The hydrogen bonding is maximum strong in– **F-H --- O**
- The comparatively high boiling point of HF is due to– **Formation of hydrogen bonds and consequent association**
- Intramolecular H-bonding is present in– **Salicyaldehyde**
- The species has intramolecular H-bonds – **o-Nitrophenol**
- The interparticle forces in liquid hydrogen are.– **Vander waal's forces**
- The H-bonds is expected to have maximum strength is – **H-O---H**
- The correct order of strength of H-bonding in the given compound is – **$H_2O > H_2O_2$**
- The boiling point is high for– **Ethyl alcohol**
- Water molecules contain _____ hydrogen bonds.– **Intermolecular**
- The compound miscible with water – **C_2H_5OH**
- The hydrogen bond is present in– **Ice**
- The best explains that o-nitrophenol is more volatile than p-nitrophenol– **Hydrogen bonding**
- If equatorial plane in PCl_5 molecule is the X–Y plane, the orbital hybridising to produce axial bonds are– **p_z, p_{z^2}**
- The pair of molecules have the same shape but difference in polarity (polar or non-polar)– **CO_2 and N_2O**
- The two species are not isostructural– **SiF_4 and SF_4**
- Assuming 2s-2p mixing is not operative, the paramagnetic species - **C_2**
- Among KO_2, AlO_2^- and BaO_2 the unpaired electron is present in– **KO_2 only**
- The decreasing order of O–O bonds length in molecules is– **$Na_2O_2 > KO_2 > O_2 > O_2 > (AsF_6)$**
- The fluoride whose value of dipole moment is not equal to zero, is– **SF_4**
- $\overset{\cdot\cdot}{\underset{\cdot\cdot}{N}} = N = \overset{\cdot\cdot}{\underset{\cdot\cdot}{N}}$ Calculate the formal charge of each I, (I) (II) (II)

  II and III nitrogen atom respectively.– **–1, +1, –1**
- The bond order of individual carbon-carbon bonds in benzene is– **Between 1 and 2**
- A wrong order with respect to the property mentioned against each– **$O_2^{2-} > O_2 > O_2^+$ [Paramagnetic moment]**
- The compounds B–F length is shortest in– **BF_3**
- O_2F_2 is an unstable yellow orange solid and H_2O_2 is a colourless liquid, both have O–O bond and O–O bond length in H_2O_2 and O_2F_2 respectively is– **1.48Å, 1.48Å**
- The bond angle θ would result in maximum dipole moment for the triatomic molecule XY, shown below– **θ = 90°**
- The p–p orbital overlapping is present in the molecule– **Chlorine molecule**
- The boiling point of a compound is raised by– **Intermolecular hydrogen bonding**
- The unit conversion of dipole moment is- **1 D = 3.3356 × 10^{-30} Cm**
- The hydrocarbons has the lowest dipole moment?– **$CH_3C \equiv CCH_3$**
- The sets of species does not follow octet rule – **CO, PCl_5,PCl_3, $AlCl_3$**
- The molecule contains $\sigma_{sp^3-sp^3}$ and σ_{sp^3-p} bonds in it is– **CH_3CH_2Cl**
- Bond angle between two hybrid orbitals is 107°, s-orbital character of hybrid is nearly– **25%**
- In piperidine  the hybrid state assumed by N is– **sp^3**
- The fractional bond order is – **H_2^-**
- In O_2^-, O_2 and O_2^{2-} molecular species, the total number of anti bonding electrons respectively are– **7, 6, 8**

Search on TG: @apna_pdf
@apna_pdf

- The Atomic numbers of three elements A, B and C are a, a +1 and a + 2. C is an alkali metal. In a compound of A and C, the nature of bonding is– **Ionic**
- If Na^+ ion is larger than Mg^{2+} ion, and S^{2-} ion, and S^{2-} ion is larger than Cl^- ion, less soluble in water– **MgS**
- The compound contains ionic as well as covalent bonds is– **KCN**
- The type of overlapping is shown by p(p_x, p_y and p_z)- orbitals– **Two sidewise and one end to end overlap**
- The electronegativity difference between N and F is greater than N and I, yet the dipole moment of NH_3 (1.5D) is greater than that of NF_3 (0.2D). This is because– **In NH_3, the orbital dipole and bond dipole are in same direction where as in NF_3 these are in opposite direction**
- The pairs of molecules will have permanent dipole moment for both members– **NO_2 and O_3**
- In a molecule having the shape of an octahedron, the s-character in the hybrid orbital of the central atom is– **16.66%**
- The set with reference to molecular formula, hybridisation of central atom and shape of the molecule is – **BeCl_2, sp, linear**
- The force responsible for the union of two ice blocks as a single block is– **Hydrogen bonds**
- The geometry is not possible when the central atom is having sp^3d-hybridization– **Trigonal planar**
- The pairs will have same bond order– **F_2 and O_2^{2-}**
- 2s and 2p-atomic orbitals combine to give how many molecular orbitals– **8**
- The Non-linear molecule is– **SO_2**
- A non-polar molecule is – **BF_3**
- The hybridisation leads to a regular geometry with none of the bond angles equal to 90°, is– **sp^3**
- XeF_4 has– **Sqare planar shape, Two lone pairs resting On Xe, Five atoms in the same plane**
- Axial d-orbital(s) is/are used in the hybridisation of– **SF_6, PCl_5, Xe F_5^+**
- In the molecule of the type AX_2L_n (where L represents lone pairs & n is number), there exists a bond b/w element A & X. The ∠XAX–**Will be max for n = 3**
- Anti-bonding molecular orbital is formed by– **Substraction of wave functions of atomic orbitals**
- How many molecule which has sp^3d hybridisation $[ICl_2]^-$, BrF_5, SOF_4, SF_6, $XeOF_4$, ClF_3, $[I(CN)_2]^-$, PCl_5– **4**
- All the species are diamagnetic in nature?– $\left[C_2, O_2^{2-}, N_2^{2+}\right]$
- Stability of the species Li_2, Li_2^- and Li_2^+ increases in the order of– **$Li_2^- < Li_2^+ < Li_2$**
- Isostructural species are those have the same shape and hybridisation. The given species, identify the isostructural pairs– **[BF_4^- and NH_4^+]**
- Polarity in a molecule and hence the dipole moment depends primarily on electronegativity of the consituent atoms and shape of a molecule. has the highest dipole moment is – **H_2O**
- The types of hybrid orbitals of nitrogen in NO_2^+, NO_3^- and NH_4^+ respectively are expected to be– **sp, sp^2 and sp^3**
- Hydrogen bonds are formed in many compound e.g., H_2O, HF, NH_3. The boiling point of such compounds depends to a extent on the strength of hydrogen bond and the number of hydrogen bonds. The correct decreasing order of the boiling points above compounds is– **$H_2O > HF > NH_3$**
- In PO_4^{3-} ion, the number of bond pairs and lone pairs of electrons on nitrogen atom are– **4, 0**
- The species has tetrahedral geometry– **BH_4^-**
- Number of π bonds and σ bonds in the structure



5, 19

- The molecule/ion does not contain unpaired electrons is - **O_2^{2-}**
- The molecule/ion, all the bonds are not equal?– **C_2H_4**
- The electronic configuration of an element is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^2\ 4s^2$, the four electrons involved in chemical bond formation will be– **$3d^2$, $4s^2$**
- The angle corresponds to sp^2 hybridization– **120°**
- The order of energies of molecular orbitals of N_2 is order is – $(\pi 2p_y) < (\sigma 2p_z) < (\pi^* 2p_x) = (\pi^* 2p_y)$
- The bond order– **$O_2^- < O_2 < O_2^+$**
- The electronic configuration of the outer most shell of the most electronegative element is– **$2s^2 2p^5$**
- The maximum 'lone pair-lone pair' electron repulsions– **XeF_2**
- BF_3 is planar and electron deficient compound. Hybridization and number of electrons around the central atom, respectively are– **sp^2 and 6**
- The molecules is non-polar in nature– **SbCl_5**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

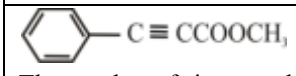
- The set of molecules will have zero dipole moment is– **Boron trifluoride, berylium difluoride, earbon dioxide, 1, 4-dichlorobenzene**
- Molecule does not exist– **He_2**
- The diatomic molecular species has only π bonds according to Molecular Orbital Theory– **C_2**
- Consider the species:
  CN^+, CN^-, NO and CN
  one of these will have the highest bond order– **CN**
- The order of the increasing ionic character is– **$BeCl_2 < MgCl_2 < CaCl_2 < BaCl_2$**
- The compounds of elements in group IV is most ionic– **$PbCl_2$**
- Two elements X and Y combine to form a compound XY. Under what conditions the bond formed between them will be ionic– **If the difference in electro negativities of X and Y is more than 1.9**
- The elements forms predominantly covalent compounds as compared to other elements of alkaline earth metals, form ionic compounds– **Be**
- The canonical or resonating structures of a molecule, describe the structure of a molecule the rule is– **The same number of unpaired and paired electrons in all structures**
- The correct dipole moment of NH_3 and NF_3 respectively is– **4.90×10^{-30}C m and 0.80×10^{-30}C m**
- The pairs of electrons tend to occupy such positions that minimize repulsions according to- **VSEPR theory**
- In a bonded molecule, the order of repulsion between the bonded and non-bonded electrons is– **lone pair – lone pair > lone pair – bond pair > bond pair – bond pair**
- The BCl_3 is a planar molecule whereas NCl_3 is pyramidal, because– **BCl_3 has no lone pair but NCl_3 has a lone pair of electrons**
- Structure of XeF_4 is– **Square planar**
- The type of overlapping is shown by p(p_x, p_y and p_z) - orbitals is– **Two sidewise and one end to end overlap**
- Oxygen molecule is formed by– **One p-p axial and one p-p sidewise overlap**
- The types of bonds are present between two carbon atoms in acetylene molecule is– **One sigma bond and two pi bonds**
- Propyne molecule contains– **6 sigma and 2 pi bonds**
- Total number of sigma and pi bonds present in toluene are – **15σ and 3π bonds**
- Atomic orbitals of carbon in carbon dioxide are– **sp-hybridised**
- On hybridisation of one s and three p-orbitals, we get– **Four orbitals with tetrahedral orientation**

EXAM POINT

Covalent bond and Ionic or Electrovalent Bond

A covalent molecule AB_3 has pyramidal structure. The number of lone pair and bond pair electrons in the molecule are respectively– **1 and 3**	**COMEDK-2018 Karnataka-CET, 2009**
The compound having coordinate bond?– **NH_4Cl**	**JIPMER-2012 Karnataka-CET, 2009**
The sum of the number of dative bonds present in all the given species are Al_2Cl_6, $Al(H_2O)_6$, CO, NH_4^+ – **10**	**TS EAMCET 10.08.2021, Shift-II**
A hard substance melts at high temperature and is an insulator in both solid and in molten state. This solid is most likely to be a– **covalent solid**	**(JEE Main 2021, 18 March Shift-II)**
Number of different bonds present in P_4O_{10} is .....– **12 P–O bonds and 4 P = O bonds**	**AP EAMCET (Engg.) 18.09.2020, Shift-I**
The bond in a molecule of ethyl magnesium bromide is ionic in nature– **Mg — Br bond**	**MHT CET-03.05.2019, Shift-I**
The compound is not a conductor of electricity– **Solid NaCl**	**Karnataka-CET-2018**
Maximum number of covalent bonds formed by N and P are– **3, 5**	**Kerala-CEE-2018**
Anhydrous mixture of KF and HF contain ions – **K^+, HF_2^-**	**JIPMER-2016**
HCl gas is covalent and NaCl is an ionic compound. This is because–	**Karnataka-CET-2016**

Search on TG: @apna_pdf
@apna_pdf

electronegativity difference between H and Cl is less than 2.1	
CO is practically non-polar since– **the σ-electron drift from C to O is almost nullified by the π-electron drift from O to C**	**WB-JEE-2012**
The dative bond is present in– **SO_3**	**JCECE-2011**
The compound which contains both ionic and covalent bond– **NH_4Cl, K_2SO_4, KCN**	**BCECE-2010 MHT CET-2007**
In the electronic structure of H_2SO_4, the total number of unshared electrons is– **20**	**JIPMER-2010**
The nature of the bond in diamond is– **covalent**	**J & K CET-2008**
The number of covalent bonds in fluorine molecules is– **1**	**J & K CET-2007**
The combination forming an electrovalent bond– **H and Ca**	**UPTU/UPSEE-2005**
Ionic bonds are usually formed by combination of elements with– **low ionisation potential and high electron affinity**	**CG PET -2005**
An example of a polar covalent compounds is:– **HCl**	**JCECE-2005**
When electric current is passed through an ionic hydride in molten state:– **hydrogen is liberated at anode**	**Kerala-CEE-2005**
Among the given set of compounds, the non-polar molecule – HCl, HF, H_2, HBr– **H_2**	**UPTU/UPSEE-2004**
The number of S – S bonds in sulphur trioxide is– **zero**	**J & K CET-2003**
Ionic bond is present in – **$BaCl_2$**	**JCECE-2003**
The weakest bond is – **hydrogen bond**	**J & K CET-2001**
The attractive force which holds various constituents together in different chemical species is called– **chemical bond**	**J & K CET-2014**
The species having one π-bond and maximum number of canonical forms– **CO_3^{2-}**	**(JEE Main 2021, 25 July Shift-II)**
The total number of overlapping p-orbitals present in cycloheptatrienyl cation is– **6**	**TS-EAMCET (Engg.), 06.08.2021**
The energy is stored in the links between the atoms– **Chemical energy**	**NDA (I)-2019**
The number of σ and π-bonds in 2-formylbenzoic acid are respectively.– **17, 5**	**MHT CET-02.05.2019, Shift-II**
The number of pi-bonds present in benzoic acid molecule are– **4**	**MHT CET-03.05.2019, Shift-I**
A π-bond is formed by side way overlapping of– **p-p orbitals**	**J & K CET-2019**
In the formation of **π** -bond, the atomic orbitals overlap in such a way that– **their axes remain parallel to each other and perpendicular to the internuclear axis**	**J & K CET-2014**
The molecule having longest covalent bond distance– **C–C**	**AP EAMCET (Engg.) -2014**
The species containing equal number of a σ and π-bonds– **XeO_4**	**NEET-2013**
The molecule containing no π bond– **H_2O**	**NEET-2013**
The enolic form of acetone contains– **9 sigma bonds, 1 pi bonds and 2 lone pairs**	**AMU-2012**
The number of sigma (σ) and pi (π) covalent bonds respectively in benzene nitrile are.....– **13, 5**	**GUJCET-2011**
 The number of sigma and pi bonds present in the above molecule respectively– **20,**	**SCRA-2010**
The type of bonds present in sulphuric anhydride are– **3σ , one pπ – pπ and two pπ – dπ**	**BITSAT-2009 VITEEE- 2009**
Non-directional orbital is:– **3s**	**BCECE-2006**

TEAM SKY

Search on TG: @apna_pdf

@apna_pdf

In $[Ag(CN)_2]^-$, the number of π bonds is:– **4**	**AIIMS-2006**
The number of sigma (σ) and pi (π) bonds present in sulphuric acid molecule?–**6σ,**	**AP-EAMCET (Medical), 2002**
The sequence of increasing covalent character among NaCl, LiCl, $BeCl_2$ is represented by– **NaCl < LiCl < $BeCl_2$**	**JCECE - 2016, 2012 JIPMER-2007 NEET-2005**
The charge/size ratio of a cation determines its polarizing power. The sequence representing the increasing order of the polarizing power of the cationic species, K^+, Ca^{2+}, Mg^{2+}, Be^{2+} is – **K^+<Ca^{2+}< Mg^{2+}< Be^{2+}**	**COMEDK 2017 JIPMER-2015 AIEEE-2007**
The correct Lewis acid order for boron halides is– **BI_3 > BBr_3 > BCl_3 > BF_3**	**BCECE-2017, 2016**
The correct decreasing order of solubility of the sulphates in water is– **$BeSO_4$ > $MgSO_4$ > $CaSO_4$ > $SrSO_4$ > $BaSO_4$**	**Manipal-2020, BCECE-2015**
Among Al_2O_3, SiO_2, P_2O_3 and SO_2, the correct order of acid strength is– **Al_2O_3 < SiO_2 < P_2O_3 < SO_2**	**Assam CEE-2014, AIEEE-2004**
The correct order of the increasing basic nature of the oxides are– **Al_2O_3 < MgO < Na_2O < K_2O**	**Assam CEE-2014 (AIEEE 2011)**
Among LiCl, $BeCl_2$, BCl_3 and CCl_4, the covalent bond character follows the order– **LiCl < $BeCl_2$ < BCl_3 < CCl_4**	**JIPMER-2013 NEET-1990**
The compound having highest Lewis acid strength in boron trihalides– **BI_3**	**Manipal-2016 J & K CET-(2009)**
The order of acidic strength in the compounds Cl_2O_7, SO_2, P_4O_{10} is– **Cl_2O_7 > SO_2 > P_4O_{10}**	**AMU-2012, 2001**
The most covalent halide among AlF_3, $AlCl_3$, $AlBr_3$, AlI_3 is– **AlI_3**	**AP EAPCET 24.08.2021, Shift-I**
The correct order of boiling point among NH_3, H_2O, HF is– **H_2O > HF > NH_3**	**Kerala-CEE-29.08.2021**
The decreasing order of the basic strength of the species CN^-, NH_2^-, HS^-, CH_3^- is– **CH_3^- > NH_2^- > CN^- > HS^-**	**TS-EAMCET (Engg.), 05.08.2021 Shift-II**
Among the following, these oxides are amphoteric- BeO, ZnO, Sb_2O_3, CO, CaO, SO_2, SO_3– **BeO, ZnO, Sb_2O_3**	**TS-EAMCET (Engg.), 07.08.2021 Shift-II**
The acidic oxide in group 14 is– **GeO**	**TS EAMCET 10.08.2021, Shift-II**
The Lewis acid is– **B_2H_6**	**TS EAMCET 10.08.2021, Shift-II**
Among the following, these oxides are basic in nature As_2O_3, Na_2O, MgO, Mn_2O_3, CaO, ZnO, N_2O, N_2O_5– **MgO, CaO, Na_2O**	**AP EAPCET 24.08.2021, Shift-I**
Among LiCl, $BeCl_2$, BCl_3 and CCl_4, the covalent bond character varies as– **LiCl<$BeCl_2$<BCl_3<CCl_4**	**COMEDK 2020**
Among HCl, HF, HI, HBr the correct order of stability is : **HI < HBr < HCl < HF**	**GUJCET-2020**
The increasing order of hydrolysis of the compounds– **CCl_4 < $MgCl_2$ <$AlCl_3$ <$SiCl_4$ < PCl_5**	**[AIIMS-26 May, 2018 (E)]**
The oxidation number of oxygen has been arranged in increasing order in the given compounds KO_2, OF_2, BaO_2, O_3– **BaO_2 < KO_2 < O_3 < OF_2**	**JIPMER-2017**
The correct order of stability for the given superoxides RbO_2, KO_2, CsO_2– **KO_2 < RbO_2 < CsO_2**	**JIPMER-2017**
The order of covalent character of KF, KI, KCl is– **KF < KCl < KI**	**TS-EAMCET-2016**

Search on TG: @apna_pdf

Thermal stability of $BaCO_3$, $CaCO_3$ and $MgCO_3$ is– **$BaCO_3 > CaCO_3 > MgCO_3$**	**BCECE-2016**
Reactivity order of halides for dehydrohalogenation is– **R–I > R – Br > R – Cl > R–F**	**Karnataka-CET-2016**
The correct order of increasing polarizing power of the cations in the following $AlCl_3$, $MgCl_2$, NaCl is– **$NaCl < MgCl_2 < AlCl_3$**	**AMU-2015**
The solubility of fluorides of alkali metals in water is– **CsF > RbF > KF > NaF > LiF**	**BCECE-2015**
The relative strength of trichlorides of boron group to accept a pair of electron is given by– **$BCl_3 < AlCl_3 < GaCl_3$**	**Kerala-CEE-2015**
The sequence of increasing covalent character in the following LiCl, NaCl, $BeCl_2$ is represented by– **NaCl < LiCl < $BeCl_2$**	**Assam CEE-2014**
The molecules BF_3 and NF_3 are both covalent compounds, but BF_3 is non polar whereas NF_3 is polar. The reason for this is :– **BF_3 is planar but NF_3 is pyramidal**	**BITSAT 2014**
The correct order of acidic strength is– **$Cl_3C.COOH > Cl_2CH.COOH > Cl.CH_2COOH > CH_3COOH$**	**GUJCET-2014**
The correct order of the basic strength of metallic hydroxides– **$Al(OH)_3 < Lu(OH)_3$**	**GUJCET-2014**
For BCl_3, $AlCl_3$ and $GaCl_3$ the increasing order of ionic character is– **$BCl_3 < GaCl_3 < AlCl_3$**	**WB-JEE-2013**
Among the elements B, Mg, Al and K, the correct order of increasing metallic character is– **B < Al < Mg < K**	**Kerala-CEE-2013**
Among LiCl, RbCl, $BeCl_2$ and $MgCl_2$ compounds with maximum and minimum ionic character are respectively– **RbCl; $BeCl_2$**	**SRMJEEE – 2012**
The polarizing power of the following anions, N^{3-}, O^{2-} and F^-, follow the order– **$N^{3-} > O^{2-} > F^-$**	**AMU-2012**
The orbital having zero probability of finding the electron in the xy-plane – **p_z**	**AMU-2012**
The correct acidity order of Li_2O, BeO and B_2O_3 is – **$Li_2O<BeO<B_2O_3$**	**UPTU/UPSEE-2011**
The Lewis acid is – **H^+**	**JIPMER-2010**
The order of stability of metal oxides is– **$Fe_2O_3 < Cr_2O_3 < Al_2O_3 < MgO$**	**Karnataka-CET, 2009**
The water insoluble compound is – **Magnesium fluoride**	**AP EAMCET (Engg.) -2007**
The most basic oxide – **Bi_2O_3**	**NEET-2006**
Amphoteric oxides are– **SnO_2, Al_2O_3, ZnO**	**UPTU/UPSEE-2006**
Boron compounds behave as Lewis acids because of their– **electron deficient nature**	**J & K CET-(1999)**
According to Fajan's rule covalent bond is favoured by:– **small cation and large anion**	**AP EAMCET (Medical) - 1998**
Lattice energy of an ionic compound depends upon– **Charge on the ion and size of the ion**	**AP EAMCET 2009**

Bond Parameter

The maximum 'lone pair-lone pair' electron repulsions – **XeF_2**	**NEET-17.07.2022**
The correct order of bond orders of C_2^{2-}, N_2^{2-}, O_2^{2-} is respectively– **$O_2^{2-} < N_2^{2-} < C_2^{2-}$**	**JEE Main-24.06.2022, Shift-II**
According to molecular orbital theory, bond order in increasing order will be– **$O_2^{2-} < O_2^- < O_2 < O_2^{2+}$**	**JEE Main-26.06.2022, Shift-I** **CG PET -2009** **(JEE Main 2021, 25 July Shift-II)** **Karnataka-CET-2016** **NEET-2015, cancelled** **Tripura JEE-2021**

TEAM SKY
Search on TG: @apna_pdf
@apna_pdf

The decreasing order of bond angle is– **$NO_2^+ > NO_2 > NO_2^-$**	**NEET-2015, cancelled WB-JEE-2013 NEET-2008 J & K CET-(2004)**
The correct order of bond angles (smallest first) in H_2S, NH_3, BF_3, and SiH_4 is– **$H_2S < NH_3 < SiH_4 < BF_3$**	**AMU-2016 Assam CEE-2014 AIEEE-2004**
The correct bond length order is– **$O_2 < O_3 < O_2^{2-}$**	**BCECE-2018 AIIMS-2017, 2007**
The ONO angle is maximum is:– **NO_2^+**	**Assam CEE-2014 BCECE-2010 AIIMS-2004**
The stability order is correct– **$O_2^+ > O_2 > O_2^- > O_2^{2-}$**	**AMU-2014, 2005 BITSAT-2007**
The correct order of C – O bond length among CO, CO_3^{2-} ,CO_2 is– **$CO < CO_2 < CO_3^{2-}$**	**BCECE-2016 CG PET- 2015 AMU-2013**
The pair of species that has the same bond order is– **CO, NO^+**	**AIIMS-2016 Karnataka NEET-2013**
The largest bond length is– **O_2^{2-}**	AMU-2004, 2003
The correct sequence of bond order is – **$O_2^+ > O_2 > O_2^-$**	**TS-EAMCET-04.08.2021, Shift-I **AMU 2002
The species, NO, NO^+, NO^{2+} and NO^-, the one with minimum bond strength is– **NO^-**	**(JEE Main 2020, 5 Sep. Shift-I) J & K CET-(2017)**
The compounds has the smallest bond angle– **SH_2**	**(AIEEE-2003) JCECE - 2008**
The calculated bond order of superoxide ion O_2^- is– **1.5**	**J & K CET-(2015) Karnataka-CET, 2008**
The pair have identical bond order– **CN^- and NO^+**	**Kerala-CEE-2017, 2009**
H–O–O bond angle in H_2O_2 is– **94.8°**	**UP CPMT-2005 MHT CET-02.05.2019, SHIFT-II**
The species has unequal bond lengths?– **SF_4**	**(JEE Main 2021, 25 Feb Shift-II)**
The correct shape and I—I—I bond angles respectively in I_3^-, ion are– **Linear, 180°**	**(JEE Main 2021, 24 Feb Shift-II)**
The molecule has the maximum bond enthalpy is?– **CO**	**TS-EAMCET 09.08.2021, Shift-I**
The order of the average bond length of the given bonds is– **C ≡ C < C = O < N – O < C = N**	**TS-EAMCET (Engg.), 06.08.2021**
The species has unequal bond lengths– **SF_4**	**JEE Main 25.02.2021, Shift-II**
How many among the given species have a bond order of 0.5? H_2^+. He_2^+. He_2^-. B_2^+. F_2^-. Be_2^{2-} – **4**	**AP EAPCET 19-08-2021, Shift-II**
The correct sequence of bond-energies– **(S – S) > (Se – Se) > (O – O) > (Te – Te)**	**AP- EAPCET- 07-09-2021, Shift-I**
The given species have a bond order of 3 CO, NO^+, C_2^{2-} , O_2^{2+} , CN^-, NO– **5**	**AP- EAPCET- 07-09-2021, Shift-I**

Search on TG: @apna_pdf

The correct order of Cl–O bond lengths in $ClO^-, ClO_2^-, ClO_2^-, ClO_4^-$? – **$ClO_4^- < ClO_3^- < ClO_2^- < ClO^-$**	**[BITSAT-2021]**
The difference between bond orders of CO and NO^+ is x/2 where x = ... (Round off to the nearest integer).– **0**	**(JEE Main 2021, 27 July Shift-I)**
The set contains same bond angle around central atom– **BF_3, BCl_3, BBr_3**	**TS EAMCET 10.08.2021, Shift-I**
The given species have the highest bond order? CN^-, CO, NO^+, O_2^+, O_2, N_2– **4**	**TS EAMCET 10.08.2021, Shift-I**
The correct order of Sulphur oxygen bond order in SO_3, $S_2O_3^{2-}$ and SO_4^{2-} are– **$S_2O_3^{2-} < SO_4^{2-} < SO_3$**	**AP EAPCET 20.08.2021 Shift-I**
Bond order is an inverse measure of — **Bond-length**	**AP EAPCET 20.08.2021 Shift-I**
Assuming AB is an ionic compound and r_c, r_a are the ionic radii of A^+ and B^- respectively. The lattice energy of the compound AB is proportional to:– **$\frac{1}{r_c + r_a}$**	**AP EAPCET-6 Sep. 2021, Shift-II**
The compound that has the largest H—M—H bond angle (M = N, O, S, C) is– **CH_4**	**(JEE Main 2020, 5 Sep Shift-II)**
The formal charge on central oxygen atom in ozone is– **+1**	**Karnataka-CET-2020**
Bond angle in PH_4^+ is more than that of PH_3. This is because– **lone pair-bond pair repulsion exists in PH_3**	**Karnataka-CET-2020**
The correct order of bond energy (in kJ/mol) of the molecules is– **$B_2 < O_2 < C_2 < N_2$**	**Kerala-CEE-2020**
The sets of species have similar bond order – **N_2, CO, NO^+**	**AP EAMCET (Engg.) 17.09.2020 Shift-I**
The correct order of variation of bond angles in the given molecules– **$BF_3 > NH_3 > NF_3 > PCl_3$**	**AP EAMCET (Engg.) 21.09.2020, Shift-II**
The relationship between the dissociation energy of N_2 and N_2^+ is– **dissociation energy of N_2> dissociation energy of N_2^+**	**COMEDK 2019**
In dimer of phosphorus pentaoxide, in what order number of P – P, P = O & P – O – P bonds are there?– **P – O – P > P = O > P – P**	**AIIMS 26 May 2019 (Evening)**
The correct order of bond dissociation energy– **$F_2 > I_2$**	**AIIMS 25 May 2019 (Morning)**
NO^+ has bond order– **3**	**Kerala-CEE-2019**
Bond angle is minimum for– **H_2Te**	**COMEDK 2018**
% s- character of N- H bonds is maximum in:– **N_2H_2**	**AIIMS-27 May,2018 (E)**
The diatomic species do not have same bond order– **B_2^-, C_2**	**AIIMS-27 May,2018 (M)**
The species has zero bond order– **He_2**	**Manipal-2018**
The bond length (pm) of F_2, H_2, Cl_2 and I_2, respectively is– **74, 144, 199, 267**	**TS EAMCET-2017**
The incorrect statements about ozone– **Essential for breathing**	**BCECE-2017**
The bond order in CN^- ion is– **3**	**CG PET -2017**
The correct order of the C–F bond distance - CHF_3, CF_4, CH_3F and CH_2F_2– **$CH_3F > CH_2F_2 > CHF_3 > CF_4$**	**J & K CET-2017**
The common features among CO, CN^- and NO^+ are– **Bond order three and isoelectronic**	**Kerala-CEE-2017**
In molecules, all bond lengths are not equal– **PCl_5**	**AP-EAMCET – 2016**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

In PO_4^{3-}, the formal charge on each oxygen atom and the P – O bond order respectively are– **–0.75, 1.25**	**BITSAT 2016**
The correct increasing order of bond order values for the concerned species is– **$O_2^- < O_2 < N_2^+ < N_2$**	**J & K CET-2016**
Highest bond energy for a single bond is– **C – C**	**JCECE-2016**
The nitrogen-oxygen bond lengths in NO_2^+, NO_2^- and NO_3^-. The increasing order of N–O bond length is– **$NO_3^- < NO_2^- < NO_2^+$**	**SCRA-2015**
The bond length of Br – Br in Br_2 molecule is equal to– **2.28Å**	**SRMJEEE – 2015**
The bond angle of bond in methoxy methane is:– **111.7°**	**AP-EAMCET (Engg.) 2015**
The bond angle between Cl – O – Cl in Cl_2O_7 – **119°**	**BCECE-2015**
The P–P–P angle in P_4 molecule and S–S–S angle in S_8 molecule is (in degree) respectively– **60^0, 107^0**	**BITSAT 2015**
The changes in the respective bond order values are caused by removal of an electron from N_2 and F_2 molecules?– **Decrease by 0.5 in the former and increase by 0.5 in the latter**	**Kerala-CEE-2015**
The bond order of H_2^+ is– **0.5**	**S. C. R. A - 2014**
The correct order of their increasing bond order– **$He_2^+ < O_2^- < O_2^+ < C_2^{2-}$**	**COMEDK 2014**
The longest covalent bond distance is– **C — C**	**AP-EAMCET (Engg.) - 2014**
The bond angle in ClO_2^- (OClO)– **111^0**	**BCECE-2014**
Same for both hydrogen and deuterium molecules– **Bond length**	**BCECE-2014**
N_2 and O_2 are converted into mono anions N_2^- and O_2^- respectively. The wrong statements is– **In O_2, the O–O bond order increases**	**BITSAT 2014**
The correct order for strength of C-X bond.– **$CH_3F > CH_3Cl > CH_3Br > CH_3I$**	**GUJCET-2014**
The correct order of magnitude of bond angles among the compounds CH_4, NH_3 and H_2O is– **$H_2O < NH_3 < CH_4$**	**JIPMER-2014**
The correct order of their stability C_2, Li, O_2^+, He_2^+ – **$He_2^+ < Li_2 < C_2 < O_2^+$**	**Kerala-CEE-2014**
Bond order is zero in– **Be_2**	**MHT CET-2014**
The ionization processes the bond energy increases and the magnetic behavior changes from paramagnetic to diamagnetic.– **$NO \rightarrow NO^+$**	**KARNATAKA NEET 2013**
The types of bonds between two carbon atoms in calcium carbide is– **one sigma, two pi**	**AMU-2013**
The bond order of N_2^+ on the basis of molecular orbital theory is [At. number of N = 7]– **2.5**	**J & K CET-2013**
The molecule has the shortest bond length?– **N_2**	**SCRA 2012**
Bond energy of Cl_2, Br_2 and I_2 the order is– **$Cl_2 > Br_2 > I_2$**	**AP EAMCET (Engg.) 2012**
C*l*-O bond order in perchlorate ion is– **1.75**	**AMU-2012**
The molecule having smallest bond angle is– **$SbCl_3$**	**(AIEEE-2012)**
The correct order of bond energy is– **$Cl_2 > Br_2 > F_2 > I_2$**	**J & K CET-(2012)**
The C-H bond distance is the longest in– **C_2H_6**	**J & K CET-(2012)**
The correct order in which the O–O bond length increases – **$O_2 < O_3 < H_2O_2$**	**JCECE-2012**

Search on TG: @apna_pdf

@apna_pdf

The shortest bond length is–	**C–F**	**Kerala-CEE-2012**
The least bond energy is –	**N_2^{2-}**	**MHT CET-2012**
The species has highest bond energy–	**O_2^+**	**MHT CET-2012**
Bond order in nitrogen molecule is–	**3**	**COMEDK 2011**
The correct comparison of the stability of the molecules is–	**$H_2^+ > He_2^+$**	**VITEEE- 2011**
The value of Cl – Cl bond distance is found to be–	**1.98Å**	**SRMJEEE – 2011**
The bond order of C_2 molecule is–	**2**	**J & K CET-2011**
The correct statement with regard to H_2^+ and H_2^- is–	**H_2^+ is more stable than H_2^-**	**JIPMER-2011**
When O_2 is converted into O_2^+ –	**paramagnetic character decreases and the bond order increases**	**Karnataka-CET-2011**
The incorrect with respect to bond length of the species–	**$O_2 > O_2^-$**	**Kerala-CEE-2011**
The bond length of species O_2, O_2^+, and O_2^- are in the order of–	**$O_2^- > O_2 > O_2^+$**	**UP CPMT-2011**
The order of bond energies in halogen molecules is–	**$Cl_2 > Br_2 > F_2 > I_2$**	**AP- EAMCET(Medical) - 2010**
The correct order of magnitude of bond angles among the compounds CH_4, NH_3 and H_2O–	**$H_2O < NH_3 < CH_4$**	**AP- EAMCET(Medical) - 2010**
The correct order towards bond angle is–	**$sp^3 < sp^2 < sp$**	**JIPMER-2010**
The correct order increasing bond angles is–	**$ClO_2^- < Cl_2O < ClO_2$**	**(NEET-2010)**
The bond angle in H_2O is 104.5° and in H_2S it is 92.5°. The difference is due to–	**The larger size of S atom compared to atom minimizes electron repulsions and allows the bonds in H_2S to be purely p-type**	**SCRA - 2009**
Fluorine reacts with dilute NaOH and forms a gaseous product A. The bond angle in the molecule of A is–	**103°**	**VITEEE- 2009 AP EAMCET (Engg.)-2009**
The bond angle and % of d-character in SF_6 are–	**90°, 33%**	AMU – 2009
Two species are isostructural–	**XeF_2, IF_2^-**	**BITSAT 2009**
H – O – H bond angle in H_2O is 104.5° and not 109° 28' because of–	**lone pair-lone pair repulsion**	**JIPMER-2009**
According to MO theory which of the lists ranks the nitrogen species in terms of increasing bond order?–	**$N_2^{2-} < N_2^- < N_2$**	**NEET-2009**
Right order of dissociation energy N_2 and N_2^+ is–	**$N_2 > N_2^+$**	**NEET-2009**
The carbon-carbon bond distance in benzene is–	**Longer than a C = C double bond**	**MPPET-2008**
C*l* - P -C*l* bond angles in PCl_5 molecule are–	**120° and 90°**	**VITEEE- 2008**
In the molecules NO, CO, O_2^- and O_2 the correct sequence of bond order is–	**$CO > NO > O_2 > O_2^-$**	**AMU – 2008**
From the molecular orbital theory, one can show that the bond order in F_2 molecule is–	**1**	**J & K CET-2008**
The bond angle C–O–H in alcohol if hybridisation of C and O atom possess sp^3 hybridisation?–	**109°28'**	**GUJCET-2007**
The strength of bonds formed by s-s, p-p, and s-p overlap is in the order of–	**s – s < s – p < p – p**	**SRMJEEE–2007**

JEAMSPY

Search on TG: @apna_pdf

@apna_pdf

The order of stability of O_2 and its various ionic species– **$O_2^+ > O_2 > O_2^- > O_2^{2-}$**	**AMU – 2007**
The bond length between C – C bond in sp^2 hybridised molecule is– **1.39 Å**	**BCECE-2007**
For a stable molecule, the value of bond order must be– **positive**	**Karnataka-CET-2007**
The paramagnetic with bond order 0.5 is – **H_2^+**	**Kerala-CEE-2007**
On comparison with H – C – H bond angle of methane, the C – N – C bond angle of trimethylamine is– **no change**	**VITEEE- 2006**
In the dichromate dianion,– **6 Cr – O bonds are equivalent**	**BITSAT 2006**
Bond order of N_2 molecule is– **3**	**CG PET -2006**
If the value of bond order is zero, then– **molecule will be unstable**	**CG PET -2006**
The decreasing values of bond angles from NH_3 (107°) to SbH_3 (91°) down group –15 of the periodic table is due to– **Decreasing electronegativity**	**(AIEEE-2006)**
According to bond order concept, the correct order of stability of O_2, O_2^+ and O_2^- is– **$O_2^+ > O_2 > O_2^-$**	**J & K CET-2006**
Bond angle in H_2O is:– **104.5^0**	**JCECE - 2006**
The correct arrangement of compounds involved based on their bond strength– **HF > HCl > HBr > HI**	**JIPMER-2006**
In the nitrogen family the H-M-H bond angle in the hydrides (MH_3) gradually becomes closer to 90° on going from N to Sb. This shows that– **almost pure p-orbitals are used for M–H bonding**	**CG PET -2005**
The angle between two covalent bonds is maximum in– **CO_2**	**CG PET -2005**
The molecules has the smallest bond angle– **H_2Se**	**Kerala-CEE-2005**
Bond order in benzene is– **1.5**	**UP CPMT-2005**
The bond order of O_2^+ same as in– **N_2^+**	**UP CPMT-2004**
The oxidation state of Xe and XeO_3 and the bond angle in it respectively, are :– **+ 6, 103°**	**AP-EAMCET/2003**
The molecules is most stable– **N_2**	**AMU–2003**
The bond order of O_2^+ is:– **2.5**	**JCECE - 2003**
The bond energies (in kJ mol^{-1}) of P–H, As–H and N–H are respectively– **318, 247 and 389**	**AP EAMCET- 2002**
An element M reacts with chlorine to form a compound X. The bond angle in X is 120°. What is M?– **B**	**AP-EAMCET (Medical), 2002**
The molecule has highest bond energy– **N–N**	**AIIMS-2002**
Bond order of N – O bonds in nitrate ion is– **1.33**	**AMU 2002**
Bond angle of 109°28′ is found in– **$\overset{\oplus}{N}H_4$**	**(AIEEE-2002)**
The species containing shortest O – O bond length is– **O_2^+**	**J & K CET-(2002)**
The correct order is for the bond energies of halogen molecules?– **$Cl_2 > Br_2 > I_2$**	**AP EAMCET- 2001**
The catenation tendency of C, Si and Ge is in the order Ge < Si < C. The bond energies (in kJ mol^{-1}) of C–C, Si–Si and Ge–Ge bonds, respectively, are:– **348, 180, 167**	**AP EAMCET- 2001**
The lowest bond angle– **H_2S**	**AP-EAMCET/2000**
The angle between two covalent bonds is highest– **CH_4**	**AP-EAMCET (Med.)-1999**
The correct order of the bond angles is– **$NH_3 > H_2O > PH_3 > H_2S$**	**J & K CET-(1997)**
The bond angle of H_2X (where, X is a sixth group element), as one goes down the group,– **Decreases**	**AP EAMCET- 1996**

Search on TG: @apna_pdf

@apna_pdf

The effect of repulsion between the two lone pairs of electrons present on oxygen in water molecule is :– **decrease in H–O–H bond angle**	**AP-EAMCET/1996**
Cyclic hydrocarbon 'A' has all the carbon and hydrogen atoms in a single plane. All the carbon-carbon bonds have the same length, less than 1.54 Å, but more than 1.34 Å. The bond angle will be– **120^0**	**NEET-1989**
The Cl–C–Cl angle in 1, 1, 2, 2-tetrachloro-ethene and tetra-chloromethane respectively will be about– **120^0 and 109.5^0**	**NEET-1988**
The bond angles of NH_3, NH_4^+ and NH_2^- are in the order– **$NH_4^+ > NH_3 > NH_2^-$**	**VITEEE 2014**
The species have the same bond order– **CN^- and NO^+**	**Kerala CEE 2009, NEET 2017**
Stability of the species Li_2, Li_2^- and Li_2^+ increases in the order of– **$Li_2^- < Li_2^+ < Li_2$**	**JEE Main 2013**
The bond order has increased and paramagnetic character has changed to diamagnetic?– **$NO \rightarrow NO^+$**	**JEE Main 2019**
The correct order of bond angles (smallest first) in H_2S, NH_3, BF_3 and SiH_4 is– **$H_2S < NH_3 < SiH_4 < BF_3$**	**AIEEE 2004**
The dipole-dipole interaction energy between rotating polar molecules is proportional to____ where 'r' is the distance between polar molecules.– **$\frac{1}{r^6}$**	**Kerala CEE -03.07.2022**
The molecules exhibiting zero dipole moment– **BF_3, CH_4, SiF_4, $BeCl_2$, CCl_4, 1,4-dichlorobenzene**	**J & K CET-(2014, 2006, 2010) AMU-2008 AP-EAMCET (Engg)-2005, 2015 Manipal -2016 JCE JCE -2010**
If a molecule MX_3 has zero dipole moment, the sigma bonding orbital used by M (At. no. 13) are– **sp^2-hybridised**	**CG PET-2005 J & K CET-(1999)**
The dipole-dipole interaction energy stationary polar molecules and rotating polar molecules, respectively is proportional to r is the distance between the polar molecules– **$\frac{1}{r^3}, \frac{1}{r^6}$**	**TS EAMCET 05.08.2021, Shift-I**
One Debye is equal to _____ coulomb meter– **3.33×10^{-30}**	**TS EAMCET 05.08.2021, Shift-I**
Dipole-dipole interaction energy between polar molecules in solids depends on the radius of the molecule (r) and it is directly proportional to– **$(1/r^3)$**	**Kerala-CEE-2016**
The correct order of dipole moment for NH_3, H_2O and CO_2 molecules is– **$H_2O > NH_3 > CO_2$**	**AP-EAMCET (Medical), 2008**
The molecules having permanent dipole moments- **NO_2 and O_3**	**AIEEE-2003**
$CHCl_3$ is a polar solvent while CCl_4 is a non-polar solvent because CCl_4 has– **symmetrical structure**	**J & K CET-(2019)**
Dipole-dipole interaction energy between stationary polar molecule separated by a distance 'r' is proportional to– **$1/r^3$**	**Assam CEE-2019**
The correct order of dipole moment of H_2O, NH_3, NF_3, BF_3 is – **$BF_3 < NF_3 < NH_3 < H_2O$**	**NEET-Odisha-2019**
The correct order of dipole moment of NH_3 and BF_3– **$BF_3 < NH_3$**	**AIIMS-27.05.2018 (M)**
The formal charge on the central oxygen atom in O_3 molecule is– **+1**	**COMEDK-2016**
The formal charges of $N_{(1)}$, $N_{(2)}$ and O atoms in $:\ddot{N}_1 = N_2 = \ddot{O}:$ are respectively **–1,+1,0**	**BCECE-2014 AP-EAMCET- (Engg.)-2011**
The formal charges of C and O atoms in $CO_2(:\ddot{O} = C = \ddot{O}:)$ are, respectively– **0, 0**	**AP EAMCET (Engg.) - 2012**

JEAM SPY

Search on TG: @apna_pdf

@apna_pdf

VSEPR Theory

Number of lone pair(s) of electrons on central atom and the shape of BrF_3 molecule respectively, are– **2, bent T-shape**	**JEE Main-29.06.2022, Shift-II**
Pair of species having identical shape for molecule is:– **XeF_2, CO_2**	**CG PET-22.05.2022**
In the dichromate dianion $(Cr_2O_7)^{2-}$– **6 Cr – O bonds are equivalent**	**CG PET-22.05.2022**
The given oxides of nitrogen; N_2O, N_2O_3, N_2O_4 and N_2O_5 the number of compound/(s) having N – N bond is:– **3**	**JEE Main-28.06.2022, Shift-II**
In the structure of SF_4 the lone pair of electrons on S is in.– **Equatorial position and there are two lone pair-bond pair repulsion at 90°**	**JEE Main-28.06.2022, Shift-II**
The shape of XeF_6 is– **Distorted octahedral**	**WB JEE-2014 JIPMER-2011 Karnataka CET-2016 AP- EAMCET(Medical) - 2010 AMU-2007, 2004, 2003**
In XeF_2, XeF_4, XeF_6 the number of lone pairs on Xe are respectively– **3, 2, 1**	**BITSAT-2021, AMU-2015 Assam CEE-2014, AIEEE-2011, 2002**
The molecule are all atoms coplanar– **BF_3**	**WB JEE-2016, JIPMER-2007 CG PET -2005, J&K CET-2001, 1999**
Molecular shapes of SF_4, CF_4 and XeF_4 and the number of lone pairs on the central atom are respectively– **different, with 1, 0 and 2**	**Kerala-CEE-2013, 2004 JCECE - 2008 UPTU/UPSEE-2007 (AIEEE-2005)**
The number of lone pairs of electrons possessed by the central atom in the anionic species I_3^- is– **three**	**AMU – 2008 (JEE Main 2021, 20 July Shift-I)** MHT CET-2012, JCECE - 2011
Shape of XeF_4 molecule is:– **Square Planar**	**HP CET-2018, AMU-2015 J&K CET-2005 AIIMS-1998**
The pair in which the two species are not isostructure is– **SiF_4 and SF_4**	**AMU-2016 UPTU/UPSEE-2007 NEET-2004**
The pairs is iso-structural– **XeF_2, IF_2^-**	**Tripura JEE-2019 AIEEE-2003 NEET-2001**
The structure of H_2O_2 is– **non-planar**	**AMU-2013, JCECE - 2005, NEET-2003**
The shape of ClF_3 molecule is– **T-shape**	**Kerala CEE-2016, BCECE-2011 J&K CET-2010**
The shape of water molecule according to VSEPR theory, is– **distorted tetrahedral**	**MHT CET-2018 CG PET -2008**
CO_2 is isostructural with– **$HgCl_2$**	**CG PET -2005 NEET-1992**
XeF_2 is isostructural with:– **ICl_2^-**	**Manipal-2019 NEET-2013**
Shape and hybridisation of SO_2 are– **V shape, sp^2**	**UP CPMT-2012, 2010**

Search on TG: @apna_pdf

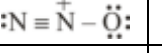
@apna_pdf

The shape of $Fe(CO)_5$ molecule is– **trigonal bipyramidal**	**AMU-2004, BCECE-2012**
The conversion involve change in both by hybridisation and shape– $BF_3 \longrightarrow BF_4^-$	**Karnataka CET-2015 BCECE-2014**
The species, correct set of iso structural pairs are : $NF_3, NO_3^-, BF_3, H_3O^+$ – **(NF_3, H_3O^+) and (NO_3^-, BF_3)**	**BCECE-2017, J&K CET-2000**
The square pyramidal geometry is – **BrF_5**	**MHT CET-03.05.2019, SHIFT-I AMU – 2010**
According to VSEPR theory, the geometry of ammonia and water molecules will, respectively, be– **pyramidal and bent**	**AMU-2019, J&K CET-2012**
Molecular structures of XeO_3 and $XeOF_4$ respectively are– **pyramidal and square pyramidal**	**-EAMCET 09.08.2021, Shift-I BCECE-2017, AMU-2015**
The pairs of molecules/ions both the species are not likely to exists– **H_2^{2+}, He_2**	**Odisha NEET-2019, JEE Main-2013**
The number of species below that have two lone pairs of electrons in their central atom is ... (Round off to the nearest integer) $SF_4, BF_3^-, ClF_3, AsF_3, PCl_5, BrF_5, XeF_4, SF_6$ – **2**	**(JEE Main 2021, 18 March Shift-II) J&K CET-2011**
The shape of gaseous $SnCl_2$ is– **angular**	**JIPMER-2017 MHT CET-2011**
XeF_6 on partial hydrolysis gives a compound X, which has square pyramidal geometry 'X' is– **$XeOF_4$**	**Kerala-CEE-29.08.2021 Karnataka-CET-2021**
According to VSEPR theory, the molecular shape of BrF_3 is– **Bent T-shape**	**TS EAMCET 10.08.2021, Shift-I AMU-2017**
Number of non-bonding electron pair on Xe in XeF_6, XeF_4 and XeF_2 respectively will be .....– **1, 2, 3**	**AMU-2013 GUJCET-2011**
A pair of molecules with see-saw shape and linear shape, respectively, is– **SF_4 and C_2H_2**	**TS-EAMCET (Engg.), 07.08.2021 Shift-II J&K CET-2015**
The shape of NH_3 molecule is:– **Trigonal pyramidal**	**MHT-CET-2007 AIIMS-2001**
H–O–H bond angle in H_2O is 104.5° and not 109° 28' because of:– **Lone pair-lone pair repulsion**	**AP-EAMCET (Medical), 2006 UP CPMT-2008**
XeF_2, NO_2, HCN, ClO_2, CO_2 Identify the non-linear molecule-pair from the above mentioned molecules.– **ClO_2, NO_2**	**WB-JEE-30.04.2022**
Molecular bromine on reaction with three moles of molecular fluorine produces an inter halogen compound. The total number of lone pairs at the central halogen atom is ——— **2**	**AP EAPCET 25.08.2021, Shift-II**
The electronic geometry of IF_4^+ is – **Trigonal bipyramidal**	**TS EAMCET 10.08.2021, Shift-I**
Incorrect matching amongst is____(according to geometry of molecules)– **H_2O, NH_3**	**AP EAPCET 20.08.2021 Shift-II**
The shapes of BrF_5 and XeF_4, respectively are– **square pyramid, square planar**	**TS-EAMCET (Engg.), 06.08.2021**
The linear species is – **N_3^-**	**JEE Main 17.03.2021, Shift-II**
A central atom in a molecule has two lone pairs of electrons and forms three single bonds. The shape of this molecule is– **T-shaped**	**(JEE Main 2021, 17 March Shift-I)**

JEAMSPY

Search on TG: @apna_pdf

@apna_pdf

In NO_3^- ion, the number of bond pairs and lone pairs of electrons on nitrogen atom are– **4, 0**	**AP EAMCET (Engg.) 17.09.2020, Shift-II**
The molecule/ion, all the bonds are not equal?– **C_2H_4**	**AP EAMCET (Engg.) 17.09.2020, Shift-II**
The lone pairs of electrons are present in a hydroxyl ion– **Three pairs**	**AP EAMCET (Engg.) 17.09.2020 Shift-I**
The geometry with respect to the central atom of the molecules $N(SiH_3)_3$ - Me_3N, $(SiH_3)_3$ P respectively are– **planer, pyramidal, pyramidal**	**AP EAMCET (Engg.) 17.09.2020 Shift-I**
SbF_5 reacts with XeF_4 to form an adduct, the shapes of cation and anion in the adduct respectively are– **T-shaped, octahedral**	**AP EAMCET (Engg.) 18.09.2020, Shift-I**
The molecules can be represented as AB_2E_2, where A-central atom, B-bond pairs of electrons, E-lone pairs of electrons– **H_2O**	**AP EAMCET (Engg.) 18.09.2020, Shift-I**
The number of 120º, Cl—P—Cl angles in phosphorus pentachloride are– **3**	**AP EAMCET (Engg.) 18.9.2020 Shift-I**
If AB_4, molecule is a polar molecule, a possible geometry of AB_4 is– **Square pyramidal**	**(JEE Main 2020, 2 Sep. Shift-I)**
The molecular geometry of SF_6 is octahedral. The geometry of SF_4 (including lone pair(s) of electrons, if any)?– **Trigonal bipyramidal**	**(JEE Main 2020, 2 Sep. Shift-II)**
The correct statement regarding shapes of PCl_5, BrF_5 & IF_7 is:– **square pyramidal**	**AIIMS 26 May 2019 (Evening)**
Ag^+ reacts with excess of sodium-thio sulphate then the obtained species having charge & geometry respectively– **–3, Linear**	**AIIMS 25 May 2019 (Morning)**
The number of species having zero lone pair at central atom is? XeO_3, XeO_2F_2, XeO_4, XeO_3F_2– **2**	**AIIMS 25 May 2019 (Morning)**
The incorrect about cyanogens gas– **It has bent structure**	**AIIMS 26 May 2019 (Morning)**
The pair contains 2 lone pair of electrons on the central atom – **I_3^+, H_2O**	**Karnataka-CET-2019**
The number of π-bonds and σ-bonds present in naphthalene are respectively– **5, 19**	**Karnataka-CET-2019**
According to the VSEPR theory, the shape of ClO_3^- would be– **Pyramidal**	**Kerala-CEE-2019**
The shape and magnetic nature of permanganate ion– **Tetrahedral, diamagnetic**	**MHT CET-03.05.2019, SHIFT-I**
In ClF_2^- and ClF_4^- the number of lone pair and shape – **3-Linear, 2-Square planar**	**AIIMS-27 May,2018 (M)**
O_2 contains alteast one e^- in σ2p bonding MO –	**AIIMS-26 May,2018 (E)**
Structure anions of acids, HNO_3, H_3PO_4 and H_2SO_4 are respectively– **planar, tetrahedral and tetrahedral**	**AMU-2018**
The correct increasing order of lone pair of electrons on the central atom – **$IF_7 < IF_5 < ClF_3 < XeF_2$**	**BITSAT 2018**
The geometry of the compound MB_4L_2? Here B is bond pair and L is lone pair.–] **Square planar**	**J & K CET-(2018)**
The species having pyramidal shape according to VSEPR theory is– **OSF_2**	**TS EAMCET-2017**
IF_7 is known to exist while BrF_7 does not exist the reason is.– **stability of higher oxidation state increases with the size**	**J & K CET-(2017)**
The correct electron dot structure of N_2O molecule is– 	**Karnataka-CET-2017**
The structure of a molecule is expected to have three bond pairs and one lone pair of electrons is– **Pyramidal**	**Karnataka-CET-2017**

Search on TG: @apna_pdf

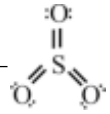
@apna_pdf

The pairs of compounds is isoelectronic and iso-structural is– **IBr_2^-, XeF_2**	**NEET-2017**
The shape of XeF_5^- will be– **planar**	**WB-JEE-2017**
XeO_4 molecule is tetrahedral having– **Four pπ–dπ bonds**	**AIIMS-2016**
The molecules, maximum number of lone pairs is present on the central atom– **XeF_2**	**AP-EAMCET – 2016**
The central atom the molecules, has 3 bond pairs and 2 lone pairs of electrons in its valence shell– **Chlorine trifluoride**	**J & K CET-(2016)**
The pairs of ions is isoelectronic and is isostructural– **CO_3^{2-}, NO_3^-**	**NEET-II 2016**
The molecule C_3O_2 has a linear structure, This compound has– **4σ and 4π bonds**	**UPTU/UPSEE-2016**
The structure of XeF_2 and NH_3 respectively are– **linear, pyramidal**	**UPTU/UPSEE-2016**
The number of lone pair (s) of electrons on the central atom in $[BrF_4]^-$, XeF_6 and $[SbCl_6]^{3-}$ are, respectively– **2, 1 and 1**	**UPTU/UPSEE-2016**
The structure of carboxylate ion is best represented as–	**UPTU/UPSEE-2016**
The geometry around the central atom in ClF_4^+ is– **Trigonal bipyramidal**	**UPTU/UPSEE-2016**
The able to show geometrical isomerism– **MABCD–square planar**	**Karnataka-CET-2015**
The species are not isostructral – **XeF_4, XeO_4**	**NEET-2015**
The number of lone pairs of electrons on the central atoms of H_2O, $SnCl_2$, PCl_3 and XeF_2 respectively, are– **2, 1, 1, 3**	**WB-JEE-2015**
The shapes of ethyne and methane is – **Linear and tetrahedral**	**AP EAMCET (Engg.) -2014**
The structure of CH_3^+ is– **planar**	**Assam CEE-2014**
The geometrical shape of XeO_3 – **Trigonal pyramidal**	**GUJCET-2014**
The pair of compounds having identical shapes for their molecules is– **XeF_2, $ZnCl_2$**	**Karnataka-CET-2014**
The geometry of molecule of bromine penta fluoride is – **Octahedral**	**MHT CET-2014**
The species has planar triangular shape is– **NO_3^-**	**NEET-2014**
The molecules possesses linear geometry – **XeF_2**	**UP CPMT-2014**
The collection of isoelectronic species– **CO, NO^+, CN^-, C_2^{2-}**	**AIIMS-2013**
The shape of a trigonal bipyramid– **PF_3Cl_2**	**CG PET- 2013**
d^2sp^3 hybridisation of the atomic orbitals gives– **octahedral structure**	**Karnataka-CET-2013**
The shape of ClO_2^- according to valence shell electron pair repulsion (VSEPR) theory will be– **Angular**	**AIIMS-2012**
The pairs, the two species are not isostructural– **PF_5 and BrF_5**	**(AIEEE-2012)**
The molecules has trigonal planar geometry is– **BF_3**	**JCECE - 2012**
The C—H bond and C—C bond in ethane are formed by the types of overlap is – **sp^3-s and sp^3- sp^3**	**Karnataka-CET-2012**
The statements regarding ammonia is not correct?– **NH_3 has sp^2 hybridization**	**UP CPMT-2012**
The pairs, the central atoms have the same number of lone pairs of electrons– **XeF_2, ICI**	**AP-EAMCET- (Engg.)- 2011**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

The hybridisation of Xe and the number of lone pairs of electrons on it in XeF_6 are– **sp^3d^3, 1**	**AP-EAMCET- (Engg.)-2011**
A σ bonded molecule MX_3 is T-shaped. The number of non bonded pair of electrons is– **2**	**BITSAT 2011**
The structure of IF_7 is– **Pentagonal bipyramidal**	**(AIEEE-2011)**
The bonds present in the structure of dichromate ion are– **six equivalent Cr—O bonds and one Cr—O—Cr bond**	**Kerala-CEE-2011**
The structures is the most preferred and hence of lowest energy for SO_3– 	**NEET-2011**
Structure of ICl_2^- is– **Distorted trigonal bipyramidal**	**UP CPMT-2011**
XeF_4 has a shape of– **square planar**	**CG PET- 2010**
The conversions involve change in both hybridization and shape– **$BF_3 \rightarrow BF_4^-$**	**KARNATAKA-CET, 2010**
The molecules has hydrogen bridge bond present– **Diborane**	**WB-JEE-2010**
The number of pπ – dπ 'pi' bonds present in XeO_3 and XeO_4 molecules, respectively are– **3, 4**	**VITEEE- 2009**
A compound has four sp^3 hybridised covalent bonds. Its shape is– **tetrahedral**	**BCECE-2009**
The shape of $XeOF_2$ on the basis of VSEPR theory is– **T-shaped**	**J & K CET-(2009)**
The shape of XeF_4 molecule and hybridization of xenon in it are– **square planar and sp^3d^2**	**Kerala-CEE-2009**
The number of dπ-pπ bonds are equal to those present in ClO_4^-, is:– **XeO_3**	**AP-EAMCET/2008**
The actual geometry of NO_2^- is– **V -shape**	**MPPET-2008**
A correct set with respect to molecule, hybridisation and shape– **BCl_3, sp^2, triangular planar**	**BCECE-2008**
The two species are iso-structural– **BrO_3^- and XeO_3**	**NEET-2007**
Geometry of SiO_4^{4-} anion is– **tetrahedral**	**MHT CET-2007**
The shape of sulphate ion is :– **tetrahedral**	**BCECE-2006**
The molecules/ions, all the bonds are not equal– **SF_4**	**(AIEEE-2006)**
The molecule in its valence shell has three bond pairs of electrons and one lone pair of electron– **NH_3**	**J & K CET-(2006)**
The extremely stable molecule is– **NF_3**	**JCECE - 2006**
The molecules has pentagonal bipyramidal shape– **XeF_6**	**AMU-2005**
Shape of O_2F_2 is similar to that of;– **H_2O_2**	**AIIMS-2004**
The regular tetrahedral structure (Atomic number : B = 5, S = 16, Ni = 28, Xe = 54)– **BF_4^-**	**(AIEEE-2004)**
Compound X is anhydride of sulphuric acid. The number of σ-bonds and the number of π-bonds present in X are, respectively– **3, 3**	**AP EAMCET- 2003**
A correct set with respect to molecule hybridisation and shape– **BCl_3, sp^2, triangular planar**	**AP-EAMCET (Medical), 2003**
The electronic theory of bonding was proposed by:– **Lewis**	**BCECE-2003**
The geometry of the molecule having s and p-characters equal to 25% and 75% respectively, is:– **tetrahedral**	**JCECE - 2003**
The correct with reference to molecular formula, hybridisation of central atom and shape of the molecule– **$BeCl_2$, sp, linear**	**AP-EAMCET (Medical), 2002**
The shape of IF_5 is– **square pyramidal**	**UP CPMT-2001**

Search on TG: @apna_pdf

@apna_pdf

The number of lone pairs of electrons present on Xe in XeF_4 is– **2**	**AP EAMCET (Engg.) 2001**
The correct pair is– **$BeCl_2$ – linear**	**AP-EAMCET/2000**
d^2sp^3 hybridization represents configurations– **Octahedral**	**AP-EAMCET/1992**
The molecules does not have a linear arrangement of atoms– **H_2S**	**NEET-1989**
The molecules/ions does not contain unpaired electrons– **O_2^{2-}**	**AIEEE 2008**

Valence Bond Theory and Hybridization

The reactions involves change from sp^2 to sp^3 hybridisation of the central atom is– **$AlCl_3 + Cl^- \rightarrow AlCl_4^-$**	**Kerala CEE -03.07.2022**
The types of hybrid orbitals of nitrogen in NO_2^+, NO_3^- and NH_4^+ respectively are– **sp, sp^2, sp^3**	**(JEE Main 2021, 20 July Shift-II)** **AP EAMCET (Engg.) 17.09.2020, Shift-II** **NEET-II 2016, Assam CEE-2014** **AMU-2015, 2008**
The hybridization involved in PCl_5 is– **sp^3d**	**J & K CET-(2011)** **UPTU/UPSEE-2011** **WB-JEE-2010**
Hybridisation in XeF_2 and XeF_4 are respectively _____.– **sp^3d and sp^3d^2**	**GUJCET-2022, AMU-2005**
sp^2-hybridisation is– **C_2H_4**	**JIPMER-2012** **NEET-1996**
The 'd' orbital involved in the hybridisation in the PCl_5 molecule is– **$4d_{x^2-y^2}$**	**J & K CET-(2009, 2005)**
The geometrical shape of sp^3d hybridization is– **trigonal bipyramidal**	**J & K CET-(2007, 2002)**
An sp^3-hybrid orbital contains– **$\frac{1}{4}$ s-character**	**JIPMER-2011** **NEET-1991**
The type of hybridisation and number of lone pair(s) of electrons of Xe in $XeOF_4$, respectively, are– **sp^3d^2 and 1**	**(JEE Main 2019, 10 Jan Shift-I)** **UPTU/UPSEE-2015**
The planar structure of BF_3 can be explained by the fact that BF_3 is– **sp^2-hybridised**	**J & K CET-(2017)** **BCECE-2007**
Sulphur reacts with chlorine in 1 : 2 ratio and form X. Hydrolysis of X gives a sulphur compound Y. What is the hybridisation state of central atom in the anion of Y is– **sp^3**	**AP- EAPCET- 07-09-2021, Shift-I** **AP-EAMCET (Engg.)-2004**
The octahedral molecule is– **SF_6**	**J & K CET-(2017, 1998)**
The hybridization state of 'B' in BCl_3 is:– **sp^2**	**AP EAMCET (Medical) - 1998** **AP-EAMCET-1996**
sp^3d hybridisation results in:– **A trigonal bipyramidal molecule**	**UPTU/UPSEE-2005, 2004**
XeF_6 on partial hydrolysis gives a compound X, which has square pyramidal geometry 'X' is– **$XeOF_4$**	**Kerala-CEE-29.08.2021**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

The reaction $BCl_3 + NH_3 \rightarrow BCl_3 . NH_3$. The geometries of BCl_3 and $BCl_3 . NH_3$ respectively are _____– **Trigonal planar & Tetrahedral**	**AP EAPCET 23-08-2021 Shift-I**
In the molecules/ions the central atom is sp^2 hybridized? BF_3, NO_2^-, NH_2^-, & H_2O– **BF_3 & NO_2^-**	**AP EAPCET 19-08-2021 Shift-I**
The hybridization of the central atom in the species ICl_2^+ is ____– **sp^3**	**AP EAPCET-6 Sep. 2021, Shift-II**
The hybridization of Se in SeF_4 and its geometry respectively are_____– **sp^3d, see-saw shaped**	**AP EAPCET 20.08.2021 Shift-II**
The molecules is formed by sp^3d hybridisation is – **PF_5**	**Kerala-CEE-2020**
The percentage of s-character in the hybrid orbitals of nitrogen in NO_2^+, NO_3^- and NH_4^+ respectively are– **50%, 33.3%, 25%**	**Karnataka-CET-2020**
The linear shape of CO_2 is due to.....– **sp-hybridisation of carbon**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
The reaction in which the hybridisation of the underlined atom **$\underline{Xe}F_4 + SbF_5 \rightarrow$** sp^3d^2 is affected is– **$\underline{Xe}F_4 + SbF_5 \rightarrow$**	**(JEE Main 2020, 4 Sep Shift-II)**
The hybridisation of Be in BeF_2 molecule– **sp**	**AP EAMCET (Engg.) 18.09.2020, Shift-I**
The hybridisation on the five carbon atoms from left to right in pent-1-en-4-yne are– **sp^2, sp^2, sp^3, sp, sp**	**AP EAMCET (Engg.) 18.09.2020, Shift-I**
hybridization of O in H_2O is – **sp^3**	**JIPMER-2019**
Valence bond theory of L. Pauling and J.C. Slater accounts for ..... characteristics of covalent bond.– **directional**	**AP-EAMCET-1993**
The hybridization and geometry in $N(SiH_3)_3$, respectively, are– **sp^2, triangular planar**	**AMU-2019**
The hybridization state of boron in its trihalides is– **sp^2**	**J & K CET-(2019)**
The ion that has sp^3d^2 hybridisation for the central atom, is– **$[ICl_4]^-$**	**(JEE Main 2019, 8 April Shift-II)**
Type of hybridization of N and C – N – C bond angle in $(CH_3)_3N$ are _____ and respectively is– **sp^3, 108°**	**GUJCET-2019**
The number of lone pair of electron and hybridisation in $XeOF_4$ is– **1, sp^3d^2**	**CG PET -2019**
A molecule is square plannar with no lone pair. Type of hybridization is associated with – **dsp^2**	**COMEDK-2019**
The coordination geometry and hybridization of N and B atoms in a 1:1 complex of BF_3 and NH_3.– **N: tetrahedral, sp^3; B: tetrahedral, sp^3**	**COMEDK–2018**
In $XeOF_2$ molecule, the hybridisation of Xe orbital is– **sp^3d**	**BCECE-2018**
The structure of $XeOF_4$ is– **Square pyramidal**	**GUJCET-2018**
The state of hybrid orbitals of carbon in CO_2, CH_4 and CO_3^{2-} respectively is– **sp, sp^3 and sp^2**	**Karnataka-CET-2018**
Formation of PCl_3 is explained on the basis of what hybridisation of phosphorus atom?– **sp^3**	**MHT CET-2018**
In the structure of ClF_3, the number of lone pairs of electrons on central atom 'Cl' is– **two**	**NEET-2018**
Sulphur reacts with chlorine in 1:2 ratio and forms X. Hydrolysis of X gives a sulphur compound Y. The hybridisation of central atom in the anion Y is– **sp^3**	**JIPMER-2017**
The compound is polar as well as well as exhibit sp^2 –hybridisation by the central atom– **H_2CO_3**	**JIPMER-2017**
Hybridisation of carbon in CH_3^- is– **sp^3**	**Kerala-CEE-2017**

Search on TG: @apna_pdf

@apna_pdf

Hybridisation of boron in diborone (B_2H_6) is– **sp^3**	**BCECE-2016**
The hybridization of C in diamond, graphite and ethyne is in the order.– **sp^3, sp^2, sp**	**Karnataka-CET-2016**
The hybridised state of Al^{3+} in the complex ion formed when $AlCl_3$ is treated with aqueous acid is– **sp^3d^2**	**Kerala-CEE-2016**
The correct geometry and hybridization for XeF_4 are– **octahedral sp^3d^2**	**NEET-II 2016**
The non-planar species are– **SO_3^{2-}, ClO_3^-, and BO_3^{3-}**	**UPTU/UPSEE-2016**
The two species have identical shape, but differ in hybridisation is – **I_3^-, $BeCl_2$**	**AP-EAMCET (Engg.) 2015**
The hybridized state of bromine in bromine pentafluoride is– **sp^3d^2**	**Kerala-CEE-2015**
The angular shape of ozone molecule (O_3) consists of– **2 sigma and 1 pi bonds**	**JIPMER-2014**
The central atom is sp^3 hydridised is– **NH_4^+**	**Kerala-CEE-2014**
The number of electrons is the valence shell of the central atom of a molecule is 8. The molecule is– **SCl_2**	**AP-EAMCET (Engg.) - 2014**
The hybridisation of central atoms in case of diamond and carborundum respectively are– **sp^3, sp^3**	**UP CPMT-2014**
The species has a trigonal planar shape is – **CH_3^+**	**J & K CET-(2013)**
The pairs of molecules/ions, the central atoms have sp^2 hybridisation is – **BF_3 and NO_2^-**	**JCECE - 2013**
A pair both the species have sp^3 hybridization is – **NF_3, H_2O**	**AIIMS 25 May 2019 (Evening) Karnataka NEET-2013**
The pair both the species have sp^3 hybridisation is – **NF_3, H_2O**	**KARNATAKA NEET 2013**
The outer orbitals of C in ethene molecule can be considered to be hybridized to give three equivalent sp^2 orbitals. The total number of sigma (σ) and pi (π) bonds in ethene molecule is– **5 sigma (σ) and 1 pi (π) bonds**	**KARNATAKA NEET 2013**
The hybridization of carbon in molecular CO_2 is– **sp**	**J & K CET-(2012)**
The percentage of p-character of the hybrid orbitals in graphite and diamond are respectively– **67 and 75**	**Karnataka-CET-2012**
The hybridization state of the central atom and the number of lone pairs over the central atom in $POCl_3$ are– **sp^3,0**	**WB-JEE-2012**
Two ions from the list given below that have the geometry that is explained by the same hybridization of orbitals, NO_2^-, NO_3^-, NH_2^-, NH_4^+, SCN^- is – **NO_2^- and NO_3^-**	**NEET-2011**
The statements is/are true about the P–Cl bonds in PCl_5 has– **Three bonds are of one type and two of another type**	**UPTU/UPSEE-2011**
The sp^3d^2 hybridization of central atom of a molecule would lead to.– **Octahedral geometry**	**WB-JEE-2011**
In CO_2, CH_4 and CH_3^+ the hybridisation of carbon atoms are respectivly – **sp, sp^3 and sp^2**	**J & K CET-(2010)**
The AsF_5 molecule is trigonal bipyramidal. The hybrid orbitals used by the As atoms for bonding are– **$s, p_x, p_y, p_z, d_{z^2}$**	**JCECE - 2010**
A pairs of molecules/ ions, the central atoms have sp^2 hybridisation is– **BF_3 and NO_2^-**	**NEET-2010**
The species the central atom has the type of hybridization which is not the same as that present in the other three– **$SbCl_5^{2-}$**	**NEET-2010**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

The molecules the central atom does not have sp^3 hybridization – **SF_4**	**NEET-2010**
The compound is non-linear is:– **H_2O**	MPPET- 2009
In XeF_6 oxidation state and state of hybridisation of Xe, and shape of the molecule are, respectively– **+6, sp^3d^3, distorted octahedral**	**AMU – 2009**
The pairs both molecules do not possess same type of hybridisation– **BCl_3 and NCl_3**	**CG PET -2009**
The molecules/ions BF_3, NO_2^-, NH_2^- and H_2O, the central atom is sp^2 hybridised– **BF_3 and NO_2^-**	**NEET-2009**
Hybridization of the central atom in PF_5 involves the mixing of atomic orbitals– **s, p_x, p_y, p_z, d_{z^2}**	**AMU – 2008**
An octahedral complex is formed when hybrid orbitals are involved– **d^2sp^3**	**KARNATAKA-CET, 2008**
The molecules is not tetrahedral in– **CO_3^{2-}**	**AP EAMCET (Engg.) -2007**
If a molecule MX_3 has the dipole moment zero, then the sigma (σ) bonding orbitals used by M(Z < 21) is– **sp^2-hybridised**	**SRMJEEE – 2007**
The hybridisation state of carbon in fullerene is– **sp^2**	**JCECE - 2007**
The set of properties belongs to PCl_5 is– **sp^3d, trigonal bipyramidal, 5 valence shell pairs of electrons**	**J & K CET-(2006)**
In SO_2 hybridisation is :– **sp^2**	**JCECE - 2006**
The correct order regarding the electro-negativity of hybrid orbitals of carbon is– **$sp > sp^2 > sp^3$**	**NEET-2006**
A linear molecule is – **$BeCl_2$**	**AP-EAMCET/2005**
Hybridization present in ClF_3 is– **sp^3d**	**UP CPMT-2005**
Hybridisation involves– **Mixing up of atomic orbitals**	**CG PET -2004**
The states of hybridisation of boron and oxygen atoms in boric acid (H_3BO_3) are respectively– **sp^2 and sp^3**	**(AIEEE-2004)**
The maximum number of 90º angles between bond pair-bond pair of electrons is observed in– **sp^3d^2 hybridisation**	**(AIEEE-2004)**
The sp^3–hybridization is– **PCl_3**	**JIPMER-2004**
Sulphur trioxide is dissolved in heavy water to form a compound X. The hybridization state of sulphur in X is– **sp^3**	**AP EAMCET- 2003**
The number of free electrons present on each carbon atom in graphite is – **1**	**AP-EAMCET (Medical), 2003**
sp^3-hybridisation is not found in :– **BCl_3**	**BCECE-2003**
A correct pair with respect to molecular formula of Xenon compound and hybridization state of xenon in it – **XeF_2, sp^3d**	**AP EAMCET- 2002**
The hybridisation present in IF_3– **sp^3d**	**UP CPMT-2002**
Hybridisation of the underline atom changes in– **$\underline{Al}H_3$ changes to AlH_4^-**	**(AIEEE-2002)**
The hybridization state of the central atom in the conjugate base of NH_4^+ ion–**sp^3**	**AP-EAMCET/2002**
The compound has planar structure is– **XeF_4**	**(NEET-2000)**
The hybridisation state of carbon atom changes from sp^3 to sp^2 and finally to sp, the angle between the hybridised orbitals– **increases progressively**	**NEET-1993**
Linear combination of two hybridised orbitals belonging to two atoms and each having one electron leads to the formation is– **Sigma bond**	**NEET-1990**
The molecules the central atom can be said to adopt sp^2 hybridization– **BF_3**	**NEET-1989**
Equilateral shape has– **sp^2 hybridization**	**NEET-1988**

Search on TG: @apna_pdf

@apna_pdf

Molecular Orbital Theory

The paramagnetic molecules is– **O_2**	**Odisha NEET-2019, NEET-2013 JIPMER-2004, AMU–2001**
The molecule NO is– **paramagnetic**	**J & K CET-(2012) CGPET-2010, NEET-1995**
Paramagnetism is shown by– **O_2**	**Manipal-2018 J & K CET-(2012) UPTU/UPSEE-2004**
The paramagnetic behaviour of B_2 is due to the presence of– **two unpaired electrons in π-bonding MO**	**WB-JEE-2012 UPTU/UPSEE-2004**
The ionization processes the bond energy increases and the magnetic ehavior changes from paramagnetic to diamagnetic– **$NO \rightarrow NO^+$**	**AP EAPCET 24.08.2021, Shift-I Karnataka NEET-2013**
KO_2 exhibits paramagnetic ehavior. This is due to the paramagnetic nature of– **O_2^-**	**AP EAMCET (Engg.) -2014 AIIMS-2003**
The species analogous to paramagnetic ehavior like O_2 is– **gaseous sulphur**	**AMU-2019, 2014**
Molecules is not ehavior tic– **CO**	**BCECE-2012 NEET-2000**
Atomic number of Cr, Fe and Co are 24, 26 and 27 respectively. The inner orbital octahedral complexes are paramagnetic– **$[Cr(CN)_6]^{3-}$**	**AP EAPCET 23-08-2021 Shift-I**
The bond order and magnetic ehavior of O_2^- ion are, respectively– **1.5 and paramagnetic**	**(JEE Main 2021, 26 Aug. Shift-II)**
A colourless, neutral, paramagnetic oxide of nitrogen 'P' on oxidation gives reddish brown gas Q, Q on cooling gives colourless gas R. R on reaction with P gives blue solid S. Identify P, Q, R, S respectively– **NO, NO_2, N_2O_4, N_2O_3**	**Karnataka-CET-2021**
The bond order and the magnetic characteristics of CN^- are– **3, diamagnetic**	**(JEE Main 2020, 7 Jan. Shift-II)**
If the magnetic moment of a dioxygen species is 1.73 BM, it may be:– **O_2^- or O_2^+**	**(JEE Main 2020, 9 Jan. Shift-II)**
The compounds N_2O, NO, N_2O_3, NO_2, N_2O_4, N_2O_5 are diamagnetic?–**N_2O, N_2O_3,**	**AP EAMCET (Engg.) 17.09.2020 Shift-I**
The magnetic property of NO_2 is …….– **Paramagnetic**	**AP EAMCET (Engg.) 18.9.2020 Shift-I**
MnO is:– **Antiferromagnetic**	**AIIMS 26 May 2019 (Morning)**
The molecules/ions, $C_2^{2-}, N_2^{2-}, O_2^{2-}, O_2$ the diamagnetic and has the shortest bond length– **C_2^{2-}**	**(JEE Main 2019, 8 April Shift-II)**
The ground state magnetic property of B_2 and C_2 molecules will be:– **B_2 paramagnetic and C_2 diamagnetic**	**WB-JEE-2017**
The diamagnetic molecule/ion is– **O_2^{2-}**	**SRMJEEE – 2014**
Paramagnetism is exhibited due to– **Presence of unpaired electrons**	**J & K CET-(2014) UPTU-2004**
The diamagnetic molecule is– **N_2**	**UP CPMT-2014**
The paramagnetic oxides of nitrogen are– **nitrogen monoxide and nitrogen dioxide**	**J & K CET-(2011)**
The pairs of species of oxygen and their magnetic behaviour are noted below. The correct description– **O_2^+, O_2 -both paramagnetic**	**NEET-2011**

TEAM SPY

Search on TG: @apna_pdf

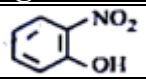
@apna_pdf

The species does not exist under normal conditions –	**Be_2**	**NEET-2010**
The molecules is paramagnetic?–	**B_2**	**J & K CET-(2009)**
The oxides is expected to exhibit paramagnetic behavior?–	**CO/O_2**	**JIPMER-2007**
The number of paired electrons is Xe atom of XeF_2 is–	**3**	**CG PET -2006**
The species H_2^+, He_2^+, and O_2^+, all are–	**paramagnetic**	**J & K CET-(1997)**
The molecules is paramagnetic–	**NO_2**	**AIIMS-1996**
The species exhibits diamagnetic behavior–	**O_2^{2-}**	**AIEEE 2007**
The species, the diamagnetic molecule is–	**CO**	**JEE Main 2019**
The molecule/ion do not contain unpaired electrons –	**O_2^{2-}**	**(JEE Main 2021, 31 Aug. Shift-II) Karnataka-CET-2012 UP CPMT-2011**
The species showing pπ – dπ bonding–	**SO_3^{2-}**	**BCECE-2016, 2012**
The elements which forms pπ – pπ bond with itself–	**N, C**	**Karnataka-CET-2017 MHT CET-2017**
Addition of an electron to an antibonding molecular orbital _____–	**decreases bond - order**	**AP-EAPCET-24.08.2021, Shift-I**
The bond stability of N_2, N_2^- and N_2^{2-} varies as–	**$N_2^{2-} < N_2^- < N_2$**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
During the change of O_2 to **O_2^-**, the incoming electron goes to the orbital.–	**$\pi^* 2p_x$**	**AIIMS 25 May 2019 (Morning)**
In the process, $O_2^+ \rightarrow O_2^{2+} + e^-$ the electron lost is from :–	**antibonding π-orbital**	**Manipal-2019**
According to molecular orbital theory, the diatomic molecular species having only π bond–	**C_2**	**NEET-2019**
According to MOT, O_2 is paramagnetic in nature. So, the number of electrons in antibonding molecular orbitals–	**6**	**AMU-2017**
The molecule (ion) having one unpaired electron is–	**NO**	**Manipal-2017 MPPET -2012**
The total number of antibonding electrons in N_2 and O_2 molecules respectively is–	**4, 6**	**AP EAMCET (Medical) - 2013**
The number of molecular orbitals obtained by mixing two atomic orbitals from each of the atoms is:–	**2**	**MPPET-2012**
According to molecular orbital theory, the total number of bonding electron pairs in O_2 is–	**5**	**AP EAMCET (Engg.)-2012**
Molecular orbital theory was proposed by–	**Mulliken**	**AP- EAMCET(Medical) - 2010**
The paramagnetic molecule –	**O_2**	**MPPET-2009**
Stability of H_2^+ and H_2^- is:–	**H_2^+ is more stable than H_2^-**	**Karnataka-CET, 2009**
Number of unpaired eletrons in O_2 molecule is:–	**two**	**UP CPMT-2005**
The molecule having unpaired electrons in antibonding molecular orbitals?–	**O_2**	**J & K CET-2002**
The paramagnetic species are–	**NO, NO_2**	**AP EAMCET- 1995**
In He_2, the electrons in bonding and antibonding orbitals are–	**2, 2**	**J & K CET-2015**
KO_2 exhibits paramagnetic behaviour. This is due to the paramagnetic nature of–	**O**	**AP-EAMCET (Engg.) - 2014**
The molecular orbital configuration of CO is $\sigma 1s^2, \sigma^* 1s^2, \sigma 2s^2, \sigma^* 2s^2, \pi 2p_x^2 = \pi 2p_y^2, \sigma 2p_z^2$ The bond order and magnetic nature of CO molecule are respectively –	**3 and diamagnetic**	**SCRA-2010**

Search on TG: @apna_pdf

@apna_pdf

Hydrogen Bonding

Intramolecular hydrogen bonding is present in- 	**NEET-05.05.2024**
The hydrogen bonded water molecules present in $CuSO_4.5H_2O$ is – **1**	**TS EAMCET 05.08.2021, Shift-I** **NEET-Odisha 2019** **SCRA-2015** **AMU-2014** **JIPMER-2013**
The high boiling point of water is due to – **Hydrogen bonding**	**UP CPMT-2003, AIIMS-1996**
The dominant intermolecular force that must be overcome to convert liquid methanol to its vapour is_____.– **Hydrogen Bonds**	**AP-EAMCET25-08-2021 Shift-I** **NEET-2009**
Intra-molecular hydrogen bonding is found in– **o-nitrophenol, cellulose, salicylaldehyde**	**AMU-2015, Kerala-CEE-2011** **KCET -2013** **NEET -II- 2016**
σ-electrons are referred to as – **Localized electrons**	**Kerala-CEE-29.08.2021**
The molecular interactions responsible for hydrogen bonding in HF– **dipole-dipole**	**AP-EAMCET (Engg.) - 2014**
The pair of molecules forming strongest hydrogen bonds are– **HCOOH and CH_3COOH**	**UPTU/UPSEE-2014**
The polypeptides are obtained by assembling the peptide units by– **intermolecular H-bonding**	**UPTU/UPSEE-2013**
The hydrogen bonds are encountered in HF, H_2O, NH_3 and HF_2^- .The relative order of energies of hydrogen bonds is– **HF_2^- > HF > H_2O > NH_3**	**AMU-2012**
The low density of ice compared to water is due to– **hydrogen bonding interactions**	**JCECE-2010**
Two ice cubes are pressed over each other until they unite to form one block. The force dominates for holding them together is – **Hydrogen bond formation**	**BITSAT-2008**
High boiling point of water is result of– **Intermolecular hydrogen bonding**	**WB-JEE-2008**
The hydrogen bonding is absent in – **CCl_4**	**AP-EAMCET (Medical), 2001**
The predominant intermolecular forces in HF is due to– **hydrogen bond formation**	**J & K CET-(2000)**
The _____could be used to estimate the strength of a hydrogen bond in water– **enthalpy change of vapourisation of water**	**J & K CET-(1998)**
Methanol and ethanol are miscible in water due to–**hydrogen bonding character**	**JIPMER-2008** **JCECE - 2007**
H_2O is liquid while H_2S is a gas due to– **H-bonding**	**UPTU/UPSEE-2008** **JIPMER-2005**
The boiling point of the water is higher than liquid HF. The reason is – **Hydrogen bonds are larger in number in water**	**WB-JEE-30.04.2022**
When hydrogen bond is formed between two molecules, it is called:– **intermolecular H-bond**	**AP-EAMCET-1993**
The compound having strongest hydrogen bonding in liquid phase – **HF**	**AP-EAMCET-1993**
Water has a higher boiling point than corresponding hydrides H_2S, H_2Se and H_2Te. This is because of:– **presence of intermolecular H-bonding in water**	**AP-EAMCET-1991**
The hydrogen bonds are strongest in vapour phase – **HF……HF**	**AIEEE 2007**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

12. Redox Reactions

Classical Idea of Redox Reactions

- H_2O_2 act as – **Oxidising as well as reducing agent**
- The element does not show disproportionation tendency– **F_2**
- Oxidation takes place with– **Loss of electrons**
- The molecules can act as an oxidising as well as reducing agent is – **H_2O_2**
- ..... acts as oxidising agent only– **H_2SO_4**
- The reactions, the underlined substance has been oxidised– **$Cl_2 + \underline{2KI} \rightarrow 2KCl + I_2$**
- In the reaction $2Na(s) + H_2(g) \rightarrow 2NaH(s)$, sodium is– **Oxidised**
- In the reaction, $2Mg(s) + O_2(g) \rightarrow 2MgO(s)$– **Element Mg gets oxidized**
- The process in oxidation number increases is– **Oxidation**

Redox Reactions in Terms of Electron Transfer Reactions and Oxidation Number

- Redox reaction have no concern with–**Neutralization of acid bases, Salt hydrolysis and Esterification**
- In the process of photosynthesis, takes place in green plants undergoes reduction– **CO_2**
- When an alkali metal is reacted with hydrogen metallic hydride is formed. In this reaction– **Hydrogen is reduced**
- Assuming complete ionization, same moles of which compounds will required the least amount of acidified $KMnO_4$ for complete oxidation– **$FeSO_4$**
- Oxidation number of potassium in K_2O, K_2O_2, and KO_2, respectively, is– **+1, +1 and +1**
- Oxidation no. of Cr in $Na_2Cr_2O_7$ is– **+6**
- In the reaction of oxalate with permanganate in acidic medium, the number of electrons involved in producing one molecule of CO_2 is– **1**
- A mixture of potassium chlorate, oxalic acid and sulphuric acid is heated. During the reaction which element undergoes maximum change in the oxidation number– **Cl**
- The number of moles of $KMnO_4$, that will be needed to react with one mole of sulphide ion in acidic solution is– **2/5**
- The oxidation number of phosphorus vary from– **– 3 to + 5**
- Oxidation number of iodine varies from– **– 1 to + 7**
- The oxidation number of C in CH_4, CH_3Cl, CH_2Cl_2, $CHCl_3$ and CCl_4 is respectively– **–4, –2, 0, +2, +4**
- Chlorine is in +3 oxidation number in– **ClF_3**
- Given that the oxidation number of sulphur is –2, the equivalent weight of sulphur is– **16**
- In a reaction between zinc and iodine, zinc iodide is formed. ..... is being oxidised– **Zinc atom**
- When iron is added to $CuSO_4$ solution, copper is precipitated. It is due to– **Reduction of Cu^{+2}**
- The oxidation number of sulphur in H_2SO_4 is– **+ 6**
- Phosphorus has the oxidation state +3 in– **Phosphorous acid (H_3PO_3)**
- The brown ring complex compound in formulated as $[Fe(H_2O)_5\ NO]SO_4$. The oxidation state of iron is– **+1**
- Oxidation number of sodium in sodium 3 amalgam is– **0**
- When SO_2 is passed in acidified potassium dichromate solution, the oxidation number of S is changed from– **+ 4 to + 6**
- In case of CH_3COOH, the oxidation number of carbon of carboxylic group is– **+3**
- The average oxidation state of chlorine in bleaching powder is– **Zero**
- When benzaldehyde is oxidised to give benzoic acid then the oxidation state of carbon of aldehydic group is changed from– **+1 to +3**
- In the reaction $2H_2O_2 \rightarrow 2H_2O + O_2$– **Oxygen is both oxidised and reduced**
- Oxidation numbers of A, B, C are +2 and –2 respectively. Possible formula of compound is– **$A_3(BC_4)_2$**
- Oxidation number of oxygen atom in O_3 molecule is– **0**
- Oxidation state of Fe in Fe_3O_4 is– **8/3**
- In oxidation process– **Number of electron decreases**
- The reactions, HNO_3 does not behave as an oxidising agent, identify it– **$2HNO_3 + P_2O_5 \rightarrow 2HPO_3 + N_2O_5$**
- The change requires an oxidising agent?– **$2S_2O_3^{2-} \rightleftharpoons S_4O_6^{2-}$**
- The oxidation number of hydrogen in CaH_2 is **–1**
- The oxidation number and covalency of sulphur in sulphur molecules (S_8) are– **0 and 2**

Search on TG: @apna_pdf

@apna_pdf

- Oxidation number of N in HNO_3 is– **+5**
- The compounds, iron has an oxidation number of +3– **$[Fe(H_2O)_6]Cl_3$**
- Oxidation states of P in $H_4P_2O_5$, $H_4P_2O_6$, $H_4P_2O_7$, respectively are– **+ 3, +4, +5**
- State the oxidation number of carbonyl carbon in methanal and methanoic acid respectively– **0 and +2**
- When copper turnings are added to silver nitrate solution, a blue coloured solution is formed after some time. It is because,– **Ag is more easily reduced than Cu**
- Oxidation number of iodine in IO_3^-, IO_4^-, KI and I_2 respectively are– **+5, +7, –1, 0**
- When sulphur dioxide is passed in an acidified $K_2Cr_2O_7$ solution, the oxidation state of sulphur is changed from– **+4 to +6**
- Oxidation number of C in HNC is– **+2**
- The oxidation state of P in Ba $(H_2PO_2)_2$ is– **+1**
- When a manganous salt is fused with the mixture of KNO_3 and the solid NaOH, the oxidation number of Mn changes from +2 to– **+6**
- In acidic medium, H_2O_2 changes $Cr_2O_7^{2-}$ to CrO_5 which has two (–O–O–) bonds. Oxidation state of Cr in CrO_5 is– **+6**
- A mixture of potassium chlorate, oxalic acid and sulphuric acid is heated. During the reaction which element undergoes maximum change in oxidation number is– **Cl**
- The decreasing order of oxidation number of sulphur– **$H_2SO_4 > H_2SO_3 > SCl_2 > H_2S$**
- In the conversion of Br_2 to BrO_3^- the oxidation number, of Br changes from- **Zero to +5**
- The oxidation number of the sulphur atoms in peroxomonosulphuric acid (H_2SO_5) and peroxodisulphuric acid ($H_2S_2O_8$) respectively, are– **+6 and +6**
- The average oxidation number of Fe in Fe_3O_4 is– $\frac{8}{3}$
- The reaction of aqueous $KMnO_4$ with H_2O_2 in acidic condition gives– **Mn^{2+} and O_2**
- Carbon is in lowest oxidation state in– **CH_4**
- Oxidation state of phosphorus in pyrophosporic acid is– **+5**
- Oxidation number of 'N' in N_3H (hydrazoic acid) is– **–1/3**
- The oxidation number of cobalt in $K[Co(CO)_4]$ is– **–1**
- The oxidation number of P is +3 is– **H_3PO_3**

Balancing of redox reactions

- The equivalent mass of $KMnO_4$ in the reaction is–

  $MnO_4^- + 5Fe^{2+} + 8H^+ \rightarrow Mn^{2+} + 5Fe^{3+} + 4H_2O$

  (M = Molecular mass)– $\frac{M}{5}$
- In the reaction,

  $IO_3^- + SO_2 + 4H_2O \rightarrow I_2 + SO_4^{2-} + 8H^+$

  the coefficient of SO_2 is– **5**
- The coefficients of I^-, IO_3^- and H^+ in the redox reaction,

  $I^- + IO_3^- + H^+ \rightarrow I_2 + H_2O$

  in the balanced form respectively are– **5, 1, 6**
- For the redox reaction

  $Zn + NO_3^- + H_2O \rightarrow Zn^{2+} + NH_4^+ + OH^-$

  In the basic medium, coefficient of Zn, NO_3^- and OH^- in the balanced reaction respectively, are– **4, 1, 10**
- The equation

  $2Br_2 + 6CO_3^{2-} + 3H_2O \rightarrow 5Br^- + BrO_3^- + 6HCO_3^-$

  Bromide is reduced as well oxidised
- In the balanced chemical reaction,

  $Cr_2O_7^{2-}(aq) + aSO_3^{2-}(aq) + bH^+(aq) \rightarrow xCr^{3+}(aq) + ySO_4^{2-}(aq) + zH_2O(l)$

  a, b, x, y and z in the above reaction correspond to– **3, 8, 2, 3, 4**
- Mn^{3+} ions are unstable in solution and undergo disproportionation to give Mn^{2+}, MnO_2 and H^+ ions. The balanced equation for the reaction will be– **$2Mn^{3+} + 2H_2O \rightarrow MnO_2 + Mn^{2+} + 4H^+$**

Redox Reactions and Electrode Processes

- The reaction redox is a **$-2CuSO_4 + 4KI \rightarrow Cu_2I_2 + 2K_2SO_4 + I_2$**
- The reactions, H_2O_2 acts as a reducing agent is–

  $HOCl + H_2O_2 \xrightarrow{H^+} H_2O^+ + Cl^- + O_2$
- In the reaction,

  $Ag_2O + H_2O_2 \rightarrow 2Ag + H_2O + O_2$

  H_2O_2 act as– **Reducing agent**
- In $Cu^{2+} + Ag \rightarrow Cu + Ag^+$, oxidation half - reaction is– **$Ag \rightarrow Ag^+$**
- Standard reduction electrode potential of three metals X, Y and Z are –1.2 V, +0.5 V and –3.0 V respectively. The reducing power of these metals will be– **Z > X > Y**
- White P reacts with caustic soda, the products are PH_3 and NaH_2PO_2. The reaction is an example of– **Disproportionation**
- ..... element undergoes disproportionation in water– **Cl_2**
- The most powerful oxidising agent is– **F_2**
- A negative E^0 means that the redox couple is– **A stronger reducing agent**

Search on TG: @apna_pdf

@apna_pdf

- The equivalent weight of $MnSO_4$ is equal to its molecular weight when it is converted to– **Mn_2O_3**
- In the following change,
  $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$
  If the atomic weight of iron is 56, then its equivalent weight will be– **21**
- The equivalent mass of potassium permanganate in strong alkaline medium is– **Molar mass itself**
- Equivalent weight of FeC_2O_4 in the reaction,
  $FeC_2O_4 \rightarrow Fe^{3+} + CO_2$ is– **M/3**
- Calculate the equivalent weight of KHC_2O_4 when it is neutralised by KOH.– **128**
- The number of moles of MnO_4^- required by 1 mole of ferric oxalate in acidic medium for oxidation is/are– **1.2**
- The oxidation states of S in SO_4^{2-}, $S_2O_8^{2-}$ & H_2SO_5 are respectively– **+6, +6, +6**
- The oxidation number of S in $Na_2S_4O_6$ is– **+5 and 0 (two S have +5 and the other two have 0)**
- The reaction
  $O_3 + 6I^- + 6H^+ \rightarrow 3I_2 + 3H_2O$
  equivalent weight of O_3 (with molecular weight M) is– **$\frac{M}{6}$**
- How many electrons should X_2H_4 liberate so that in the new compound, X shows oxidation number of –1/2 [E.N. of X > H]– **3**
- The oxidation state of oxygen in O_2PtF_6 is– **+1/2**
- $(NH_4)_2Cr_2O_7 \xrightarrow{heat} Cr_2O_3 + N_2 + 4H_2O$
  In the above reaction the oxidation state of N and chromium changes respectively as– **–3 to 0 and +6 to +3**
- In the reaction,
  $S_2O_3^{2-}(aq) + X_2(s) \text{ or } (l) \rightarrow S_4O_6^{2-}(aq) + 2X^-(aq)$ X in the above reaction will be– **Only 1**
- Equivalent weight of oxidising agent will be–
  $2H_2 + O_2 \rightarrow 2H_2O$– **8**
- The reaction (unbalanced), equivalent weight of As_2S_3 is related to molecular weight M by– **$\frac{M}{28}$**
- The reaction is an example of redox reaction– **$CH_2 = CH_2(g) + H_2(g) \rightarrow H_3C - CH_3(g)$**
- Equivalent weight of Br_2 is 96 in the disproportionation reaction–
  $Br_2 + OH^- \rightarrow Br^- + H_2O + X$
  The oxidised product is– **BrO_3^-**
- The reactions represent reduction process is– **$2HgO(s) \rightarrow 2Hg(I) + O_2(g)$**
- Among NH_3, HNO_3, NaN_3 and Mg_3N_2 the number of molecules having nitrogen in negative oxidation state is– **3**
- Among the species, ClO^-, ClO_2^-, ClO_3^- and ClO_4^-, does not show disproportionation reaction is– **ClO_4^-**
- The represents decreasing order of oxidation number of oxygen in compounds BaO_2, O_3, KO_2 and OF_2– **$OF_2 > O_3 > KO_2 > BaO_2$**
- The oxidation numbers of phosphorus in PO_4^{3-}, of sulphur in SO_4^{2-} and that of chromium in $Cr_2O_7^{2-}$ are respectively– **+5, +6 and +6**
- The redox reaction is not an example of– **$BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$**
- The oxidation number of an element in a compound is evaluated on the basis of certain rules. Which of the following is incorrect in this respect– **The oxidation number of hydrogen is always +1**
- The compounds, an element exhibits two different oxidation states– **NH_4NO_3**
- The arrangements represent increasing oxidation number of the central atom is –
  $CrO_2^-, ClO_3^-, CrO_4^{2-}, MnO_4^-$
- Identify disproportionation reaction–
  $2NO_2 + 2OH^- \rightarrow NO_2^- + NO_3^- + H_2O$
- The change is oxidation number of carbon in the reaction is– $CH_4(g) + 4Cl_2(g) \rightarrow CCl_4(l) + 4HCl(g)$– **–4 to +4**
- ..... mole of $FeSO_4$ reacted with one mole of $KMnO_4$ in acidic medium– **5**
- KCl is used as an electrolyte in salt bridge because– **Both the ions have almost same velocity**
- Electrode potential depends upon– **Temperature**
- Three metals A, B and C are arranged in increasing order of standard reduction electrode potential, hence their chemical reactivity order will be– **A > B > C**
- ..... moles of $KMnO_4$ are required to oxidise one mole of $SnCl_2$ in acidic medium– **2/5**
- The oxide, ... cannot act as a reducing agent– **CO_2**
- Addition of oxygen to an element or a compound is termed as– **Oxidation**
- Oxidation number of carbon in CH_2Cl_2 is– **0**
- Oxidation state of iron in $Fe(CO)_4$ is– **0**
- Oxidation numbers of Mn in its compounds $MnCl_2$, $Mn(OH)_3$, MnO_2 and $KMnO_4$ respectively are– **+2, +3, +4, +7**
- Oxidation state of S in $H_2S_2O_8$ is– **+6**
- Oxidation number of iodine in IO_3^-, IO_4^-, KI and I_2 respectively is– **+5, +7, –1, 0**
- The oxidation number of nitrogen in $(N_2H_5)^+$ is– **–2**
- Oxidation number of sulphur in peroxomono-sulphuric acid (H_2SO_5) is– **+6**
- The oxidation state of Fe in $K_4[Fe(CN)_6]$ is– **+2**
- The oxidation state of molybodenum in its oxocomplex species $[Mo_2O_4(C_2H_4)_2(H_2O_2)]^{2-}$ is– **+3**
- The oxidation state of P in $Ba(H_2PO_2)_2$ is– **+1**
- When a piece of sodium metal is dropped in water, hydrogen gas evolved because– **Sodium loses electrons and is oxidised while water is reduced**

TEACHOO

Search on TG: @apna_pdf
@apna_pdf

- A compound contains atoms X, Y and Z. The oxidation number of X is +2, Y is +5 and Z is –2. The possible formula of the compound is– **$X_3(YZ_4)_2$**
- In the reaction :
  $3Br_2 + 6CO_3^{2-} + 3H_2O \rightarrow 5Br^- + BrO_3^- + 6HCO_3^-$
  Element that undergoes disproportionation is- **Bromine**
- Phosphorus on reaction with NaOH produces PH_3 and NaH_2PO_2. This reaction is an example of– **Disproportionation**
- The oxidation number of carbon in C_3O_2 (carbon suboxide) is– **+4/3**
- In the conversion of Br_2 to BrO_3^-, the oxidation state of Br changes from– **0 to +5**
- Total number of electrons that are involved in oxidation by $KMnO_4$ in basic medium is– **3**
- The number of electrons involved in the conversion of MnO_4^- to MnO_2 is– **3**
- The stoichiometric constants for the reaction
  $pCu + qHNO_3 \rightarrow rCu(NO_3)_2 + sNO + tH_2O$
  p, q, r, s and t respectively are– **3, 8, 3, 2, 4**
- The representation of reaction occurring when HCl is heated with MnO_2 is–
  $MnO_2 + 2Cl^- + 4H^+ \rightarrow Mn^{2+} + Cl_2 + 2H_2O$
- When $KMnO_4$ is reduced with oxalic acid in acidic solution, the oxidation number of Mn changes from– **+7 to +2**
- When MnO_2 salt is fused with a mixture of KNO_3 and solid KOH the oxidation number of Mn changes from +4 to– **+6**
- For decolourisation of 1 mole of acidified $KMnO_4$ the moles of H_2O_2 required are– **5/2**
- The number of moles of $K_2Cr_2O_7$ reduced by one mole of Sn^{2+} ions is– **1/3**
- This acts as a self indicator– **$KMnO_4$**
- The common oxidising agents used in redox titrations are– **$K_2Cr_2O_7$, $KMnO_4$, Iodine**
- Li occupies higher position in the electrochemical series of metals as compared to Cu since–
  The standard reduction potential of Li^+/Li is lower than that of Cu^{2+}/Cu
- Half cell reactions that takes place at anode– **Oxidation**
- The solution in a beaker turns blue if–
  Cu electrode is placed in $AgNO_3$ solution
- A metal X displaces nickel from nickel sulphate solution but does not displace manganese from manganese sulphate solution. The correct order of their reducing powers is– **Mn > X > Ni**
- The strongest oxidizing agent is– **F_2**
- Fluorine is best oxidising agent because–
  It has highest reduction potential

EXAM POINT

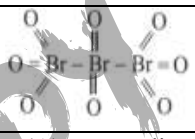
Classical idea of Redox reaction

The compound that cannot act both as oxidising and reducing agent is– **H_3PO_4**	**[JEE Main 2020, 9 Jan Shift-I]**
In the reaction $ZnO + C \rightarrow Zn + CO$, 'C' acts as:– **a reducing agent**	**NDA (I)-2015**
In organic reactions, sodium in liquid ammonia is used as– **Reducing agent**	**AP EAMCET- 2001**
Addition of oxygen to an element or a compound is termed as– **oxidation**	**J & K CET-(2014)**
The quantities that are conserved in all oxidation-reduction reaction– **Both charge and mass**	**COMEDK-2016 UPTU/UPSEE-2009**
Oxidation potential of unimoles of calomel is– **– 0.28 V**	**MHT CET-2010**
The tendency of an electrode to lose electrons is known as– **oxidation potential**	**J & K CET-(2005)**

Redox Reactions in terms of electron transfer reactions and oxidation number

In the neutral of faintly alkaline medium, $KMnO_4$ oxidises iodide into iodate. The change in oxidation state of manganese in this reaction is from– **+ 7 to + 4**	**NEET-17.07.2022**
Number of electrons transferred in each case when $KMnO_4$ acts as an oxidising agent to give MnO_2, Mn^{2+}, $Mn(OH)_3$, MnO_4^{2-} are respectively– **3, 5, 4, 1**	**CG PET-22.05.2022**
The oxidation number of chromium in potassium dichromate is– **+6**	**MHT-CET-2012, BITSAT-2008 BCECE-2007, CG PET - 2004**
The oxidation state of sulphur in the anions SO_3^{2-}, $S_2O_4^{2-}$ and $S_2O_6^{2-}$ follow the order– **$S_2O_4^{2-} < SO_3^{2-} < S_2O_6^{2-}$**	**BITSAT-2009, CG PET-2007, NEET-2003**

Search on TG: @apna_pdf
@apna_pdf

The oxidation numbers of nitrogen in NH_4NO_3– **–3, +5**	**Karnataka CET-2020 SRMJEEE – 2013, AP EAMCET- 2001 AP EAMCET (Engg.), 2001**
When hydrogen peroxide is added to acidified solution of dichromate to $Cr_2O_7^{2-}$, a deep blue coloured complex of chromium peroxide CrO_5 is formed. Oxidation state of Cr in CrO_5 is– **+6**	**JIPMER-2018 Odisha NEET-2019-2014**
$CH_4(g) + 4Cl_2(g) \rightarrow CCl_4(l) + 4\ HCl(g)$. In the above reaction, the change of oxidation state of carbon is– **from – 4 to + 4**	**Kerala-CEE-2020 NEET-2020**
The oxidation states of sulphur in S_8, S_2F_2, H_2S respectively, are– **0, +1 and –2**	**(AIIMS-2012, 2010)**
The oxidation state of chlorine in hypochlorous acid– **+1**	**AP EAMCET (Medical), 2001 AP EAMCET- 2000**
Oxidation states of Cr in $K_2Cr_2O_7$ and CrO_5 are, respectively– **+6, +6**	**WB-JEE-30.04.2022**
In Pb_3O_4, the different oxidation states of Pb is/are– **2.66 only**	**TS-EAMCET (Engg.), 07.08.2021, Shift-II**
The oxidation number of phosphorous in orthophosphorous acid is– **+3**	**Assam CEE-2021**
 The correct structure of tribromooctaoxide is–	**NEET-2019**
On heating, lead (II) nitrate gives a brown gas (A). The gas (A) on cooling changes to a colourless solid/liquid (B). (B) on heating with No changes to a blue solid (C). The oxidation number of nitrogen in solid (C) is– **+3**	**[JEE Main 2020, 4 Sep Shift-I]**
Oxidation number of potassium in K_2O, K_2O_2 and KO_2, respectively, is– **+1, +1 and +1**	**[JEE Main 2020, & Jan Shift-I]**
The number of elements among O, Cl, F, N, P, Sn, Ti, K, Sc, which show more than one non-zero oxidation state is– **6**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
H_2O_2 reduces MnO_4^- ion to– **Mn^{2+}**	**COMEDK-2020**
The ionic charges on chromate ion and dichromate ion respectively is– **–2, –2**	**MHT CET-02.05.2019, SHIFT-III**
The oxidation state of potassium in KO_2 is– **+1**	**COMEDK-2019**
The compound that does not exhibit a different oxidation number of the same element– **Fe_2O_3**	**NDA (II)-2019**
The correct order of N-compounds is its decreasing order of oxidation states is– **HNO_3, NO, N_2, NH_4Cl**	**NEET-2018**
Oxidation state of phosphorus in orthophosphoric acid is– **+5**	**JCECE - 2018**
Valence electrons in the element X are 3 and that in element Y is 6. Most probable compound formed from X and Y is– **X_2Y_3**	**JIPMER-2018**
A metal ion M^{3+} loses 3 electrons, its oxidation number will be– **+ 6**	**COMEDK-2018**
Out of the following outer electronic configurations of atoms, the highest oxidation state is achieved by– **$(n-1)d^5ns^2$**	**WB-JEE-2018**
In the conversion of Br_2 to BrO_3^-, the oxidation number of Br changes from– **0 to +5**	**COMEDK-2017**
What is the change in the oxidation state of Mn in the reaction of MnO_4^- with H_2O_2 in acidic medium– **$7 \rightarrow 2$**	**TS-EAMCET-2016**
Potassium dichromate is a good oxidising agent in acidic medium, the oxidation state of chromium changes by– **3**	**MHT CET-2015**
Oxidation numbers of P in PO_4^{3-}, of S in SO_4^{2-} and that of Cr in $Cr_2O_7^{2-}$ are respectively– **+ 5,+ 6 and + 6**	**(AIIMS-2015)**
The oxidation numbers of phosphorous in $Ba(H_2PO_2)_2$ and xenon in Na_4XeO_6 respectively are– **+1 and +8**	**UPTU/UPSEE-2015**

Search on TG: @apna_pdf

@apna_pdf

When sugar $C_{12}H_{22}O_{11}$ is burned to give carbon dioxide CO_2 , the increase in oxidation number of carbon atoms is– **+ 4**	**SCRA-2014**
The ratios of oxidation states of Cl in potassium chloride to that in potassium chlorate is– **$\frac{-1}{5}$**	**BITSAT-2014**
A reagent which lowers the oxidation number of an element in a given substance is known as– **Reducing agent**	**J & K CET-(2014)**
In Br_3O_8 compound, oxidation number of bromine is– **16/3**	**J & K CET-(2014)**
The pair compound that can exist together is– **$FeCl_2$, $SnCl_2$**	**NEET-2014**
If Cl_2 is passed through hot aqueous NaOH, the products formed have Cl in different oxidation states. These are indicated as– **–1 and +5**	**WB-JEE-2014**
The oxidation state of sulphur in $Na_2S_4O_6$ is– **$\frac{+5}{2}$**	**BITSAT-2013**
The oxidation number of C atom in CH_2Cl_2 and CCl_4 are respectively– **0 and 4**	**MHT CET-2012**
A mixture of potassium chlorate oxalic acid and sulphuric acid is heated. During the reaction which element undergoes maximum change in the oxidation number– ***Cl***	**NEET-2012**
The oxidation number of oxygen is –1 in– **Na_2O_2**	**COMEDK-2012**
A common metal used for the extraction of metals from their oxides by reduction is– ***Al***	**CG PET- 2012**
The number of electrons transferred when $KMnO_4$ acts as an oxidising agent to give MnO_2 and Mn^{2+} respectively are– **3, 5**	**CG PET- 2012**
The process of oxidation involve– **Loss of electron**	**CG PET- 2012**
Iron nails are dipped into blue copper sulphate solution. After some time iron nails are:– **dissolved and blue colour is discharged**	**NDA (I)-2011**
In chromite ore, the oxidation number of iron and chromium are respectively– **+2, +3**	**Karnataka-CET-2011**
When a manganous salt is fused with a mixture of KNO_3 and solid NaOH the oxidation number of Mn changes from +2 to– **+ 6**	**WB-JEE-2010**
The oxidation number of sulphur atoms in peroxomonosulphuric acid (H_2SO_3) and peroxodisulphuric acid ($H_2S_2O_8$) are respectively– **+6 and +6**	**J & K CET-(2009)**
Oxidation numbers of P in PO_4^{3-}, of S in SO_4^{2-}, and that of Cr in $Cr_2O_7^{2-}$ are respectively– **+ 5, + 6 and + 6**	**NEET-2009**
Number of moles of MnO_4^- required to oxidize one mole oxalate completely in acidic medium will be– **0.6 moles**	**NEET-2008**
When chlorine reacts with dil. NaOH under cold conditions, the oxidation state of chlorine changes from zero to– **–1 and +1**	**J & K CET-(2008)**
The oxidation states of iodine in HIO_4, H_3IO_5 and H_5IO_6 are respectively– **+ 7,+ 7,+7**	**(AIIMS-2008)**
The oxidation number of oxygen in KO_3, Na_2O_2 is– **–0.33, –1**	**VITEEE- 2008**
Acidic $K_2Cr_2O_7$ reacting with H_2S the oxidation number of chromium is changed– **from + 6 to + 3**	**CG PET -2008**
The oxidation state of sulphur in sodium tetrathionate ($Na_2S_4O_6$) is– **2.5**	**J & K CET-(2008)**
Oxidation state of oxygen in F_2O is– **+2**	**UP CPMT-2008**
If equal volumes of 1 M $KMnO_4$ and 1 M $K_2Cr_2O_7$ solutions are allowed to oxidize Fe (II) to Fe (III) in acidic medium, then Fe (II) oxidized will be– **More by $K_2Cr_2O_7$**	**AP - EAMCET (Medical) - 2007**
H_2O_2 on oxidation gives– **O_2**	**CG PET -2007**
$Cu^{2+}+Ag \longrightarrow Cu + Ag^+$ oxidation half reaction is :– **$Ag \rightarrow Ag^+$**	**JCECE - 2006**
Oxidation number of S in SO_4^{2-} : – **+ 6**	**BCECE-2005**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

The oxidation state of chromium in the final product formed by the reaction between KI and acidified potassium dichromate solution is– **+ 3**	**[AIEEE 2005]**
The oxidation number of xenon in $XeOF_2$ is– **4**	**J & K CET-(2005)**
When $K_2Cr_2O_7$ is converted into K_2CrO_4, the change in oxidation number of chromium is:– **0**	**UPTU/UPSEE-2005**
The compound having the lowest oxidation state of iron is:– **$Fe(CO)_5$**	**UPTU/UPSEE-2005**
The oxidation state of sulphur is +4 in– **Sulphurous acid**	**AMU-2004**
In potassium manganate, the oxidation state of manganese is– **+ 6**	**CG PET -2004**
The oxidation number of sulphur is –1 in– **FeS_2**	**J & K CET-(2002)**
When ammonium nitrate is gently heated, an oxide of nitrogen is formed. What is the oxidation state of nitrogen in this oxide– **+1**	**AP-EAMCET (Medical), 2002**
Oxidation state of Fe in Fe_3O_4 is:– **$\frac{8}{3}$**	**(AIIMS-2002), NEET-1999**
Oxidation number of C*l* in $CaOCl_2$ (bleaching powder) is– **+1 and –1, since it contains ClO^- and Cl^-**	**[AIEEE 2002]**
Consider the following reaction. $6NaOH + 3Cl_2 \rightarrow 5NaCl + A + 3H_2O$ The oxidation number of chlorine in A– **+5**	**AP-EAMCET (Medical), 2001**
The oxidation number of C in CH_3Cl– **–2**	**J & K CET-(2001)**
The oxidation number of sulphur in $H_2S_2O_7$ is:– **+6**	**(AIIMS-2000)**
The oxidation number of chromium in potassium dichromate– **+6**	**AP-EAMCET (Med.)-1999**
The oxidation number of nitrogen in HN_3 is– **$-\frac{1}{3}$**	**AP EAMCET- 1999**
Oxidation number of Os in OsO_4 is:– **+8**	**(AIIMS-1999)**
Chlorine is passed into dilute cold KOH solution. What are the oxidation number of chlorine in the products formed– **–1, +1**	**AP EAMCET- 1999**
The number of moles of acidified $KMnO_4$ required to oxidize one mole of ferrous oxalate (FeC_2O_4) is– **0.6**	**J & K CET-(1999)**
In the reactions: $2P_2O_5 + 2HNO_3 \rightarrow P_4O_{10} + x$, the term x is– **$N_2O_5$**	**AIIMS-1996**
Reaction of sodium thiosulphate with iodine gives– **Tetrathionate ion**	**NEET-1996**
The oxidation state of I in $H_4IO_6^-$ is– **+7**	**NEET-1994**
In the reaction, $NO_2^- + OCl^- \rightarrow NO_3^- + Cl^-$, the oxidation state of chorine– **Changes from +1 to –1**	**AP EAMCET- 1994**
Among the SO_2, H_2SO_4 and sodium thiosulphate, sulphur has the highest oxidation state in– **H_2SO_4**	**AP EAMCET- 1991**
Acidified potassium dichromate is treated with hydrogen sulphide. In the reaction, the oxidation number of chromium– **Decreases from +6 to +3**	**VITEEE- 2019**
In the reaction, $8Al + 3Fe_3O_4 \longrightarrow 4Al_2O_3 + 9Fe$ the number of electrons transferred from the reductant to the oxidant is– **24**	**VITEEE- 2014**
In neutral or faintly alkaline medium, thiosulphate is quantitatively oxidized by $KMnO_4$ to– **SO_4^{2-}**	**Kerala-CEE-2013**
For decolourisation of 1 mole of $KMnO_4$, the moles of H_2O_2 required is:– **5/2**	**(AIIMS-2004)**

Balancing of Redox Reaction

$aK_2Cr_2O_7 + bKCl + cH_2SO_4 \rightarrow xCrO_2Cl_2 + yKHSO_4 + zH_2O$. The above equation balances when:– **a = 1, b = 4, c = 6 and x = 2, y = 6, z = 3**	**Kerala-CEE-2004 BITSAT-2019**
Balance the following redox-reaction: $aI_2 + bNO + 4H_2O \rightarrow cHNO_3 + dHI$ Hence, find the values of a, b, c and d.– **3, 2, 2, 6**	**Tripura JEE-2022**
In the balanced equation of the following reaction, the ratio of a/b is a $aCaCO_3 + bH_3PO_4 \rightarrow pCa_3(PO_4)_2 + qCO_2 + rH_2O$– **3/2**	**TS EAMCET 04.08.2021, Shift-I**

Search on TG: @apna_pdf

@apna_pdf

BrO_3^- changes into Br_2 in an acidic medium of a unbalanced equation. The number of electron present on the balanced equation– **10 electron in left**	**JIPMER-2019**
In the redox reaction, the correct coefficients of $C_2O_4^{2-}$ and H^+ ions in the balanced equation are– **5 and 16**	**BCECE-2017**
The value of n in $MnO_4^- + 8H^+ + ne^- \rightarrow Mn^{2+} + 4H_2O$ is– **5**	**JIPMER-2016**
Consider the following reaction $6FeSO_4 + K_2Cr_2O_7 + 7H_2SO_4 \rightarrow 3Fe(SO_4) + Cr_2(SO_4)_3 + K_2SO_4 + 7H_2O$ How many electrons are involved in the above redox reaction– **6**	**SCRA-2015**
For the reaction, $NH_3 + OCl^- \longrightarrow N_2H_4 + Cl^-$ occurring in basic medium, the coefficient of N_2H_4 in the balanced equation will be– **1**	**JIPMER-2012**
MnO_4^{2-} (1 mole) in neutral aqueous medium disproportionate of– **2/3 mole of MnO_4^- and 1/3 mole of MnO_2**	**(AIIMS-2003)**

Redox Reaction and Electrode processes

The reduction potential of three metallic ions X, Y and Z correspondingly are +0.52,-3.03 and -1.18 V. The sequence of reducing capacity of these metals will be– **Y > Z > X**	**CG PET -2008**
For the electrolysis of aqueous $CuSO_4$ solution using inert Pt electrodes, the reaction on anode is– **$2H_2O \rightarrow O_2 + 4H^+ + 4e^-$**	**CG PET -2008**
The reaction, $3ClO^-(aq) \rightarrow ClO_3^-(aq) + 2Cl^-(aq)$ is an example of– **disproportionation reaction**	**Karnataka CET-2017 CG PET- 2013, SCRA – 2009**
In the following reaction $3Br_2 + 6CO_3^{2-} + 3H_2O \rightarrow 5Br^- + BrO_3^- + 6HCO_3^-$ - **Bromine is reduced and oxidised**	**Assam CEE-2021 BITSAT-2005**
In an oxidation reduction reaction, dichromate ($Cr_2O_7^{2-}$) ion is reduced to Cr^{3+} ion. The equivalent weight of $K_2Cr_2O_7$ in this reaction is– $\frac{\text{molecular weight}}{6}$	**UP CPMT-2008 AP-EAMCET (Medical)-2007**
$KMnO_4$ acts as an oxidising agent in alkaline medium. When alkaline $KMnO_4$ is treated with KI, iodide ion is oxidised to– **IO_3^-**	**Karnataka-CET-2018 Assam CEE-2018**
The disproportionation reaction.– **$2NO_2 + 2OH^- \rightarrow NO_2^- + NO_3^- + H_2O$**	**JIPMER-2018 JCECE - 2015**
To oxidize 1 mole sulphite ion in acid medium, tell the required molar amount of $KMnO_4$– **2/5**	**Tripura JEE-2021**
The number of electrons involved during the oxidation reaction of $KMnO_4$ in acidic medium– **5**	**J & K CET-(2018)**
The combustion of methane is written as – $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(l)$ The difference between enthalpy change and energy change is equal to– **–2RT**	**SCRA-2015**
When $KMnO_4$ acts as an oxidizing agent and ultimately forms MnO_4^{2-}, MnO_2, Mn_2O_3 and Mn^{2+}, then the number of electrons transferred in each case respectively are– **1, 3, 4, 5**	**JIPMER-2015**
In the redox reaction, $MnO_4^- + 8H^+ + 5Br^- \rightarrow Mn^{2+} + 4H_2O + \frac{5}{2}Br_2$ which one is the reducing agent– **Br^-**	**AMU-2014**
The compound that can work both as an oxidizing as well as reducing agent is– **H_2O_2**	**BCECE-2016, SCRA-2010, UPTU/UPSEE-2014**
The reaction.$10FeSO_4 + 2KMnO_4 + 8H_2SO_4 \rightarrow 2MnSO_4 + 5Fe_2(SO_4)_3 + K_2SO_4 + 8H_2O$ is an example of reaction of– **intermolecular redox**	**UPTU/UPSEE-2014**
The correct descending order of oxidizing power of the following is– **$MnO_4^- > Cr_2O_7^{2-} > VO_2^+$**	**Kerala-CEE-2014**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

The number of electrons that are involved in the reduction of permanganate to manganese (II) salt, manganate and manganese dioxide respectively are– **5, 1, 3**	**Kerala-CEE-2014**
On heating, chloric acid decomposes to– **$HClO_4$, Cl_2, O_2 and H_2O**	**WB-JEE-2013**
In the reaction $Pb(s) + Cu^{2+}(aq) \rightarrow Pb^{2+}(aq) + Cu(s)$ which is reducing agent– **Pb(s)**	**MPPET-2013**
$4P + 3NaOH + 3H_2O \rightarrow 3NaH_2PO_2 + PH_3$ In the above reaction, find the element undergoing both oxidation and reduction,– **P**	**SRMJEEE – 2013**
What is Z in the following reactions $BCl_3 + H_3 \xrightarrow[450^0C]{\text{Cu-Al}} X + HCl$, $X \xrightarrow{\text{methylation}} Z$ – **$(CH_3)_4B_2H_2$**	**AP EAMCET (Engg.) - 2012**
The strength of an aqueous solution of I_2 can be determined by titrating the solution with standard solution of:– **sodium thiosulphate**	**(AIIMS-2012)**
The reaction, $2H_2O_2 \rightarrow 2H_2O+O_2$; shows that H_2O_2– **is decomposed**	**UP CPMT-2012**
The correct order of increasing oxidizing power in the series is– **$VO_2^+ < Cr_2O_7^{2-} < MnO_4^-$**	**J & K CET-(2012)**
What products are expected from the dispropotionation reaction of hypochlorous acid– **HCl and $HClO_3$**	**JCECE - 2011**
When a copper rod is dipped in aqueous silver nitrate solution, the colour of the solution changes to blue. This is because– **Cu is more easily reduced than Ag**	**NDA (II)-2011**
The reduction potential values of X, Y and Z are – 3.05 V, – 0.44 V and 0.83 V respectively. Which of the following order is correct with respect to their reducing property– **X > Z > Y**	**J & K CET-(2010)**
In the reaction, $SO_2 + 2H_2S \longrightarrow 3S + 2H_2O$ the substance oxidised is– **H_2S**	**JCECE - 2010**
The reaction that takes place when Cl_2 gas is passed through conc. NaOH solution is– **disproportionation**	**WB-JEE-2009**
$I_2 + 2S_2O_3^{2-} \rightarrow S_4O_6^{2-} + 2I^-$ – **iodine is reduced, sulphur is oxidised**	**UP CPMT-2009**
Lead nitrate on heating gives lead oxide, nitrogen dioxide and oxygen. This reaction is known as– **Decomposition**	**MPPET- 2009**
The value of 'n' in the reaction: $Cr_2O_7^{2-} + 14H^+ + nFe^{2+} \rightarrow 2Cr^3 + nFe^{3+} + 7H_2O$ Will be– **6**	**MPPET-2008**
The reaction that occur at the cathode– **$Cu^{2+} + 2e^- \longrightarrow Cu$**	**AP-EAMCET (Medical), 2008**
The carbonates that decomposes readily at low temperatures– **Li_2CO_3**	**UP CPMT-2008**
What is used as an oxidiser in rocket propellants– **Ammonium perchlorate**	**Kerala-CEE-2008**
During a redox titration involving a solution containing Fe^{2+} ions against MnO_4^- in the presence of excess of H^+ ions, the number of electrons that get transferred is– **5**	**J & K CET-(2008)**
One gas bleaches the color of flowers in reduction and another gas by oxidation. The gases respectively are– **SO_2 and Cl_2**	**AP - EAMCET (Medical) - 2007**
A solution of sodium metal in liquid ammonia is a strong reducing agent due to the presence of– **solvated electron**	**CG PET -2007**
In the reaction $Cr_2O_7^{2-} + 14H^+ + 6I^- \rightarrow 2Cr^{3+} + 7H_2O + 3I_2$ Which element is reduced– **Cr**	**BITSAT-2006**
The reaction in which HNO_3 does not behave as an oxidizing agent– **$2HNO_3 + P_2O_5 \rightarrow 2HPO_3 + N_2O_5$**	**JCECE - 2005**
The oxidation state of halogen atom is '+4' in– **ClO_2**	**AMU–2003**
Both oxidation and reduction takes place in:– **$H_2 + Br_2 \rightarrow 2HBr$**	**(AIIMS-2001)**
In the following chemical reaction: $Ag_2O + H_2O + 2e^- \rightarrow 2Ag + 2OH^-$ – **water is oxidised**	**(AIIMS-2000)**
Cu^{2+} salt reacts with potassium iodide to give– **Cu_2I_2**	**JEE Main, 03.07.2021**
The species given below that does not show disproportionation reaction is– **BrO_4^-**	**COMEDK- 2014**

Search on TG: @apna_pdf

@apna_pdf

13. Hydrogen

Dihydrogen and Hydrides

- The sum of the number of neutrons and protons in the tritium isotope of hydrogen– **3**
- The ionic hydride example of is not an– **GeH_2**
- Molecular hydride is– **HF**
- Deuterium resembles hydrogen in chemical properties but reacts– **Slower than hydrogen**
- Zinc reacts with aqueous NaOH to produce H_2 & **Na_2ZnO_2**
- Hydrogen can be prepared by– **Electrolysis of acidified water, Bosch's process, Lane's process**
- Commercial hydrogen is obtained from– **Water gas**
- Electrolysis of 50% H_2SO_4 gives– **H_2O_2**
- Lane's process is for the preparation of– **H**
- In water gas shift reaction reactant is– **$H_2 + CO + H_2O(g)$**
- In Ortho and Para hydrogen, the nuclear spin respectively are– **Parallel and opposite**
- When hydrolith is treated with water it yields– **H_2**
- When 50% solution of H_2SO_4 is electrolysed by passing a current of high density at low temperature then main products of electrolysis are– **H_2 and peroxy disulphuric acid**
- ..... is most reactive– **H (atomic)**
- The ionization energy of hydrogen is high as compared to alkali metals because of– **Small size**
- The isotope of hydrogen ..... is radioactive– **Tritium**
- Hydrogen accepts an electron to attain inert gas configuration. In this way it resembles– **Halogens**
- Hydrogen acts as a reducing agent and thus resembles– **Alkali metals**
- ..... position of hydrogen explain its properties– **At the top of halogens, At the top of alkali metals**
- Ionisation energy of hydrogen is– **Lower than that of fluorine**
- The number of nucleons in D_2 molecule is– **4**
- Water gas is– **$CO + H_2$**
- The catalyst used in the water-gas shift reaction is– **Iron chromate**
- The reaction between the ..... reactants produces hydrogen– **Zn + HCl**
- High purity dihydrogen is obtained by electrolyzing– **Warm aqueous barium hydroxide**
- Hydrogen is not obtained when sodium reacts with– **Molten NaCl**
- The process by ammonia is formed from nitrogen and hydrogen is– **Haber process**
- Hydrogenation of alkenes yield– **Alkanes**
- Hydrogen is prepared from H_2O by adding– **Ca, which acts as reducing agent**
- Zn gives H_2 gas with H_2SO_4 and HCl but not with HNO_3 because– **$NO_2^{\odot}$ is reduced preference to hydronium ion**
- ..... pair of substances gives same gaseous product, when these react with water– **Ca and CaH_2**
- Ortho and para hydrogen differ in– **Proton spin**
- Deuterium resembles hydrogen in chemical properties but reacts– **Slower than hydrogen**
- Spin isomerism is shown by– **Hydrogen**
- Hydrogen can be fused to form helium at– **High temperature and high pressure**
- Maximum number of hydrogen bonding in H_2O is– **4**
- The about water is false is–**There is extensive intramolecular H–Bonding in the condensed phase**
- The fuel used to produce electrical energy in the space rocket Saturn V; when Neil Armstrong reached the moon is– **Liquid $H_2 + O_2$**
- H_2O_2 in its reaction with KIO_4 and NH_2OH respectively, is acting as– **Reducing agent, oxidising agent**
- The reagents used for softening of temporary hard water is/are– **Both (b) and (c)**
- H_2S reacts with lead acetate forming a black compound which reacts with H_2O_2 to form another compound.
  The colour of the compound is– **White**
- Reagent used to distinguish H_2O_2 and O_3 is– **$KMnO_4$**
- The produce hydrogen from water is– **Heated iron**
- The production of dihydrogen gas via water-gas shift reaction is given below

  $CO(g) + H_2O(g) \xrightarrow[\text{catalyst}]{\Delta} CO_2(g) + H_2(g)$

  The CO_2 gas is removed by scrubbing with solution of– **Sodium arsenite**
- The hydrides of group 16 elements has the higherst boiling point is– **H_2O**

JEE SKY

Search on TG: @apna_pdf
@apna_pdf

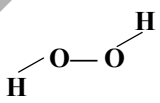
- 30 volumes H_2O_2 means– **1 cm^3 of the solution liberates 30 cm^3 of O_2 at STP**
- The reactions, H_2O_2 is acting as a reducing agent is– **$Ag_2O + H_2O_2 \rightarrow 2Ag + H_2O + O_2$**
- The reactions, hydrogen is reduced is– **$Na + H_2$**
- The reactions, H_2O_2 neither acts as an oxidising agent nor reducing agent is– **$Na_2CO_3 + H_2O_2$**
- Sulphur trioxide is dissolved in heavy water to form a compound X. The hybridisation of sulphur in X is– **sp^3**
- The synthesis gas is a – **$CO + H_2$**
- Ionic hydrides are usually– **Good reducing agents**
- In preparation of dihydrogen is not used is– **Sodium bicarbonate**
- Hydrogen gas is used on industrial scale in the manufacture of– **Margarine**
- The solution is formed when ionic hydrides react with water– **Basic**
- Among the reactions of hydrogen with halogens, the one the requires a catalyst is– **$H_2 + I_2 \rightarrow 2HI$**
- The total number of isotopes of hydrogen and number of radioactive isotopes among them, respectively, are– **3 and 1**
- An element reacts with hydrogen to form a compound A one treatment with water liberates hydrogen gas. The element can be– **Calcium**
- When electric current is passed an ionic hydride in the molten state– **Hydrogen is liberated at the anode**
- Ionization energy of hydrogen is– **Slightly higher than that of chlorine**
- Hydrogen has three isotopes: protium (^1H), deuterium (^2H or D) and tritium (^3H or T). They have nearly same chemical properties but different physical properties. They differ in– **Atomic mass**
- Moist hydrogen cannot be dried over concentrated H_2SO_4 because– **It is oxidised by H_2SO_4**
- Deuterium is also known as– **Heavy hydrogen**
- The predominant form of hydrogen is– **Protium**
- H_2 is usually prepared by the reaction of granulated zinc with– **Dilute hydrochloric acid**

Water and Heavy Water

- Permanent hardness of water is due to the presence of– **Chlorides and sulphates of calcium and magnesim**
- Boiling point of heavy water is– **101.4°C**
- Temporary hardness of water is due to the presence of– **$Ca(HCO_3)_2$**
- The formed when calcium carbide reacts with heavy water is– **C_2D_2**
- The velocity of neutrons in nuclear reactor is slowed down by– **Heavy water**
- Heavy water has maximum density at– **11.6°C**
- Heavy water is– **D_2O**
- Heavy water is called as heavy because it is– **An oxide of deuterium**
- Both cation and anion impurities can be removed from hard water by using– **Organic ion exchanges**
- Temporary hardness may be removed from water by adding– **$Ca(OH)_2$**
- Permanent hardness of water is due to the presence of– **Sulphates of Mg and Ca**
- Permanent hardness of water is removed by adding– **Sodium bicarbonate**
- Permutuit is chemically– **Hydrated sodium aluminium silicate**
- In Clark's process for removing hardness of water, the reagent used is– **Basic**
- The process permanent hardness of water can be removed is– **Washing soda**
- How many hydrogen bonded water molecule(s) are associated in $CuSO_4.5H_2O$ is– **1**
- In Clark's method, the chemical used to remove hardness of water is– **$Ca(OH_2)$**
- The contains interstitial water is– **$BaCl_2.2H_2O$**
- The moderator used in nuclear reactor is– **D_2O**
- When zeolite is treated with hard water, the sodium ions are exchanged with– **Ca^{2+} and Mg^{2+} ions**
- The heavy water is– **D_2O**
- Hardness of water is due to the presence of salts of– **Ca^{2+} and Mg^{2+}**
- Water is oxidised to oxygen by– **Flourine**
- The weight % of deuterium in heavy water is– **20**
- The responsible for the permanent hardness of water is– **Calcium sulphate**
- In ice, each oxygen is surrounded by four oxygen atoms in _____ manner.– **Tetrahedral**
- The formula of calgon, used for water softening is– **$Na_2[Na_4(PO_3)_6]$**
- Temporary hardness of water can be removed by– **Boiling**
- Zeolites are extensively used in– **Softening of water and catalyst**
- The products obtained when SO_3 is treated with D_2O is– **Deutero sulphuric acid**
- Heavy water is used in atomic reactor as– **Both moderator and coolant**
- Permutit is technical name given to– **Hydrated silicates of aluminium sodium**

Search on TG: @apna_pdf
@apna_pdf

- When two ice cubes are pressed over each other, they unite to form one cube forces is responsible to hold them together– **Hydrogen bond formation**
- Sodium hexametaphosphate are used as water softening agents because they–
  Forms soluble complexes with cationic species
- The bond angle in water molecule is nearly– **104.5°**
- Water free from soluble salts of calcium and magnesium is known as– **Soft water**
- Sodium hexametaphosphate is commercially called as– **Calgon**
- As an antiseptic, H_2O_2 is sold in the market as–
  Perhydrol Hydrogen Peroxide (H_2O_2)
- Commerical species of H_2O_2 is labelled as 10 V. Its % strength is nearly– **3**
- The reactions, H_2O_2 acts as a reducing agent–
  $$HOCl + H_2O_2 \xrightarrow{H^+} H_3O^+ + Cl^- + O_2$$
- The obtained by electrolytic oxidation of acidified sulphate solution at high current density is–
  Peroxodisulphate
- Colour of pure H_2O_2 syrupy liquid is– **Blue**
- The laboratory method for the preparation of H_2O_2 is by– **$Na_2O_2 + H_2SO_4$**
- HCl is added oxides, one would give H_2O_2– **BaO_2**
- Hydrogen peroxide is reduced by–
  Lead sulphide suspension
- The structure of H_2O_2 is– **Non-planar**
- The strength in volumes of a solution containing 30.36 g/litre of H_2O_2 is– **10 volume**
- The amount of H_2O_2 present in 1 L of 1.5 N H_2O_2 solution is– **25.5 g L^{-1}**
- The structure of H_2O_2 is–



- The O – O – H bond angle in H_2O_2 in gaseous phase is– **94.8°**
- H_2O_2 acts as an oxidising agent in–
  Both acidic and alkaline medium
- Hydrogen molecule cannot participate in coordination bond formation but chlorine molecule can– **Smaller in heavy water**
- An ionic compound is dissolved simultaneously in heavy water and simple water. Its solubility is–
  Smaller in heavy water
- Hydrogen is prepared from H_2O by adding–
  Ca, acts as reducing agent
- Hydrogen can be prepared by the action of dil H_2SO_4 on– **Iron**
- The reaction produces hydrogen is– **Mg + H_2O**
- The regarding the electrolytic preparation of H_2O_2 is– **H_2 is liberated at anode**
- The cannot be oxidised by H_2O_2 is– **O_3**
- Metal hydrides are ionic, covalent or molecular in nature. Among LiH, NaH, KH, RbH, CsH, the correct order of increasing ionic character is–
  LiH < NaH < KH < RbH < CsH
- The hydrides is electron-precise hydride is– **CH_4**
- Radioactive elements emit α, β and γ rays and are characterised by their half-lives. The radioactive isotope of hydrogen is– **Tritium**
- The oxide that gives H_2O_2 on treatment with dilute H_2SO_4 is– **BaO_2. $8H_2 + O_2$**
- The equations depict the oxidising nature of H_2O_2 is
  $$2I^- + 2H^+ + H_2O_2 + \rightarrow I_2 + 2H_2O$$
- The equation depicts reducing nature of H_2O_2 is –
  $$I_2 + H_2O_2 + 2OH \rightarrow 2I^- + 2H_2O + O_2$$
- Hydrogen peroxide is– **Both an oxidising and a reducing agent**
- When sodium peroxide is treated with dilute sulphuric acid, we get– **Sodium sulphate and hydrogen peroxide**
- Hydrogen peroxide is obtained by the electrolysis of– **Sulphuric acid**
- The reactions is an example of use of water gas in the synthesis of other compounds is–
  $$CO(g) + 2H_2(g) \xrightarrow[\text{Catalyst}]{\text{Cobalt}} CH_3OH(l)$$
- The ions will cause hardness in water sample is– **Ca^{2+}**
- Elements of group(s) of periodic table do not form hydrides is –
  Groups 7, 8, 9
- Only one element of which group forms hydride.– **Group 6**
- Interstitial hydrides are formed by– **d-block metals**
- The group of elements responsible for hydride gap– **Mn, Fe, Co**
- ..... is interstitial hydride– **CuH**
- Hydrogen exists in atomic state in the compounds– **Metallic hydrides**
- Ionic hydrides are usually– **Stoichiometric compounds**
- Group 2 hydrides with significant covalent character is/are– **BeH_2, MgH_2**
- The H–O–H angle in water molecule is about– **104.5°**
- Heavy water is– **The compound of heavier isotope of hydrogen with oxygen (D_2O)**
- The structure of H_2O_2 is– **Open book like**
- The dihedral angle of H_2O_2 in solid phase is– **90.2°**
- H_2O_2 acts as– **Oxidising agent, Reducing agent**
- Structure of blue vitriol shows presence of–
  Coordinate, Covalent and Hydrogen bond

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

- Hydrogen peroxide is used as– **Oxidising and reducing agent both**
- H_2O_2 is manufactured these days– **By electrolysis of 50% H_2SO_4**
- H_2O_2 restores the colour of old lead paintings, blackened by the action of H_2S gas by– **Oxidising PbS to $PbSO_4$**
- Decomposition of H_2O_2 can be slowed down by addition of small amount phosphoric acid which act as– **Inhibitor**
- The normally of 10 volume H_2O_2 is nearly– **1.7**
- The amount of H_2O_2 present in 1 L of 1.5 N H2O2 solution is– **25.5 g**
- H_2O and H_2O_2 resemble in– **Hybridisation of oxygen**
- Boiling point of D_2O is– **101.4°C**
- H_2O_2 acts as an oxidising agent in– **Acidic and alkaline medium**
- Hydrogen peroxide is reduced by– **Lead sulphide Suspension**
- In electronic configuration of hydrogen and halogens are similar– **Hydrogen and halogens have one electron less than the noble gas configuration**
- A nucleus containing a neutron and a proton is- **deuterium**
- Zn, Sn and Al metals will react with NaOH and KOH to liberate– **Hydrogen gas**
- Laboratory preparation of dihydrogen is– **$Zn + H_2SO_4(dil.) \rightarrow ZnSO_4 + H_2$**
- The process of production of syngas from sewage, saw-dust, scrap wood, etc. is quite common these days. The production of syngas from coal is called– **Coal gasification**
- Syngas is a mixture of– **$CO + H_2$**
- The production of dihydrogen obtained from coal gasification can be increased by reacting carbon monoxide of syngas mixture with steam in presence of a catalyst iron chromate. This process is called– **Water-gas shift reaction**
- If a mole of hydrogen molecule is heated to a high temperature then the reactions take place– **$(H_{2(g)} + 436\ kJ\ mol^{-1} \rightarrow H_{(g)} + H_{(g)}$**
- Hydrogen shows oxidation states – **+1 and –1**
- The order of reactivity of halogens towards hydrogen is– **$F_2 > Cl_2 > Br_2 > I_2$**
- Hydrogen burns air with a– **Light bluish flame**
- Ca metal directly combine with hydrogen gas to give– **A hydride**
- Alkenes combine with carbon monoxide and hydrogen in presence of octacarbonyldicobalt as catalyst under high temperature and pressure to form– **Aldehydes which can be further reduced to alcohols by hydrogen**
- ..... the trend of boiling points of hydrides of N, O and F is– **Due to higher electronegativity of N, O and F; NH_3, H_2O and HF show hydrogen bonding and hence higher boiling points then the hydrides of their subsequent group members**
- On moving from left to right in a period, the order of acidic character of hydrides of N, O & F is– **$NH_3 < H_2O < HF$**
- In group 6, only metal forms hydride is– **Cr**
- The hydride ion H^- is a stronger base than hydroxide ion OH^-. The reactions that occur if sodium hydride (NaH) is dissolved in water is – **$H^-_{(aq)} + H_2O_{(l)} \rightarrow OH^-_{(aq)} + H_{2(g)}$**
- Among NH_3, H_2O, HF and H_2S the molecule have highest magnitude of hydrogen bonding is– **HF due to maximum polarity**
- Among CaH_2, NH_3, NaH and B_2H_6, the covalent hydride are– **NH_3 and B_2H_6**
- Liquid water is denser than ice due to– **Hydrogen bonding**
- The density of water is less in its solid state because– **In solid state (ice), water molecules are arranged in highly ordered open cage like structure**
- The H–O–H angle in water molecule is about– **105^0**
- The maximum number of hydrogen bonds formed by a water molecule in ice is– **4**
- The reaction given below is called– $H_2O_{(l)} + H_2O_{(l)} \rightleftharpoons H_3O^+_{(aq)} + OH^-_{(aq)}$ **Auto-protolysis of water**
- Hydrolysis of $SiCl_4$ gives– **SiO_2**
- Fluorine decomposes cold water to give– **$4H^+ + 4F^-$ and O_2**
- Gas produced when calcium nitride (Ca_3N_2) is hydrolysed by water is– **NH_3**
- Total number of hydrogen bonded water molecules associated with $CuSO_4.5H_2O$ are– **One**
- The temporary hardness of water due to calcium bicarbonate can be removed by adding– **$Ca(OH)_2$**
- The process used for the removal of hardness of water is– **Calgon**
- A water sample is said to contain permanent hardness if water contains– **Sulphates and chlorides of calcium and magnesium**
- In a permutit, the calcium and magnesium ions of hard water are exchanged by– **Na^+ ions of permutit**
- Calgon is represented as – **$Na_2[Na_4(PO_3)_6]$**

Search on TG: @apna_pdf

@apna_pdf

- The formula for permutit or zeolite is used as softner in ion-exchange method is– **$NaAlSiO_4$**
- Presence of water can be detected by–
  Adding a drop to anhydrous copper sulphate which changes its colour from white to blue
- Polyphosphates like sodium hexametaphosphate (calgon) are used as water softening agents because-
  They form soluble complexes with cationic species
- Demineralised water is–
  Water free from cations and anions
- The chemical equation involved in the preparation of H_2O_2 from barium peroxide–
  $BaO_2.8H_2O+H_2SO_4 \rightarrow BaSO_4+H_2O_2+8H_2O$
- Reagents used for the preparation of hydrogen peroxide– **Sodium peroxide, Ethylanthraquinol, Barium peroxide**

Hydrogen peroxide

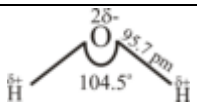
- Peroxodisulphate, on hydrolysis yields–
  Hydrogen peroxide
- H_2O_2 acts as a bleaching agent because of–
  Oxidising nature of H_2O_2
- When CO_2 is bubbled through a solution of barium peroxide in water– **H_2O_2 is formed**
- The reactions showing reducing nature of H_2O_2 is–
  $Ag_2O + H_2O_2 \rightarrow 2Ag + H_2O + O_2$
- This act as a stabiliser for the storage of H_2O_2 –
  Urea
- Last traces of water is removed from H_2O_2 by–
  Crystallisation
- The percentage by weight of hydrogen in H_2O_2 is–
  5.88%
- Heavy water is obtained by–
  Prolonged electrolysis of H_2O
- The boiling point of heavy water is– **101.4 ^{0}C**
- Heavy water (D_2O) freezes at– **3.8 ^{0}C**
- The compound that is formed when calcium carbide reacts with heavy water– **C_2D_2**
- Metal hydrides are ionic, covalent or molecular in nature. Among LiH, NaH, KH, RbH, CsH, the order of increasing ionic character is–
  LiH < NaH < KH < RbH < CsH
- CH_4 is a hydride is– **Electron-precise**
- RadiZoactive elements emit α, β and γ rays and are characterised by their half-lives. The radioactive isotope of hydrogen is– **Tritium**
- The oxide that gives H_2O_2 on treatment with dilute H_2SO_4 is– **$BaO_2.8H_2O$**
- Hydrogen peroxide is ————
  Both an oxidising and a reducing agent
- When sodium peroxide is treated with dilute sulphuric acid, we get -
  Sodium sulphate and hydrogen peroxide
- Hydrogen peroxide is obtained by the electrolysis of- **Sulphuric acid**
- The ion that cause hardness in water sample– **Ca^{2+}**
- Compound used for water softening– **$Na_6P_6O_{18}$**
- Only one element of forms hydride from group–
  Group 6
- The reaction of zinc with excess of aqueous alkali, evolves hydrogen gas and gives– **$[ZnO_2]^{2-}$**
- Tritium a radioactive isotope of hydrogen, emited the particles – **Beta (β^-)**
- Hydrogen peroxide reacts with iodine in basic medium to give– **I^-**
- Hydrogen has three isotopes : protium (^1H), deuterium (^2H or D) and tritium (^3H or T). They have nearly same chemical properties but different physical properties. They differ in– **Atomic mass**
- The method used to remove temporary hardness of water is– **Clark's method**
- The chemical nature of hydrogen peroxide is–
  Oxidising and reducing agent in both acidic and basic medium
- In acidic medium, H_2O_2 acts as a reducing agent in its reaction with– **$KMnO_4$**
- $(BH_3)_2$ is electron – **Deficient**
- The metal that gives hydrogen gas upon treatment with both acid as well as base is– **Zinc**

EXAM POINT

Dihydrogen and hydrides

Dihydrogen reacts with CuO to give– **Cu**	**JEE Main-28.06.2022, Shift-I**
In the industrial production molecular hydrogen is obtained as a by product is– **NaOH**	**JEE Main-24.06.2022, Shift-II**
The correct order of increasing intermolecular hydrogen bond strength is– **$CH_4 < HCN < NH_3$**	**JEE Main-27.06.2022, Shift-II**

TEAM SPY
Search on TG: @apna_pdf
@apna_pdf

Hydrogen has three isotopes: protium (^{1}H), deuterium (^{2}H or D) and tritium (^{3}H or T). They have nearly same chemical properties but different physical properties. They differ in– **Atomic mass**	**JEE Main-28.06.2022, Shift-II**
The production of dihydrogen gas via water-gas shift reaction: $CO_{(g)} + H_2O_{(g)} \xrightarrow[\text{Catalyst}]{\Delta} CO_{2(g)} + H_{2(g)}$ The CO_2 gas is removed by scrubbing with solution of– **sodium arsenite**	**AMU-2014**
Radioactive isotope of hydrogen is– **tritium**	**CG PET-2006 UP CPMT-2005**
When same amount of zinc is treated separately with excess of sulphuric acid and excess of sodium hydroxide solution, the ratio of volumes of hydrogen evolved is:– **1 : 1**	**JEE Main-09.01.2020, Shift-II BITSAT-2013**
The shortest wavelength in hydrogen spectrum is approximately_____– **91.2 nm**	**AP-EAMCET 25-08-2021 Shift - I**
The hydrogen emits low energy β^- particles is – **Tritium ^3_1H**	**JEE Main 26.02.2021,Shift-II**
The most suitable methods for preparing de-ionised water is– **Synthetic resin method**	**[JEE Main-2021, 26 Aug Shift-I]**
The functional groups that are responsible for the ion-exchange property of cation and anion exchange resins, respectively, are– **—SO_3H and —NH_2**	**[JEE Main-2021, 17 March Shift-II]**
The single largest industrial application of dihydrogen is– **In the synthesis of ammonia**	**[JEE Main-2021, 20 July Shift-II]**
Dihydrogen of high purity (> 99.95%) is obtained through– **The electrolysis of warm $Ba(OH)_2$ solution using Ni electrodes**	**[JEE Main-2020, 6 Sep. Shift-II]**
The equation that represents the water-gas shift reaction is– **$CO(g) + H_2O(g) \xrightarrow[\text{Catalyst}]{673K} CO_2 + H_2(g)$**	**[JEE Main-2020, 5 Sep. Shift-I]**
The metal that gives hydrogen gas upon treatment with both acid as well as base is– **Zinc**	**[JEE Main-2019, 12 April Shift-I]**
The isotopes of hydrogen are– **Protium, deuterium and tritium**	**[JEE Main-2019, 9 Jan Shift-I]**
The substances is NOT a mixture– **Ice**	**NDA (I)-2019**
The statements about water is incorrect – **Water is a non-polar molecule**	**NDA (II)-2019**
The recommended concentration of fluoride ion in drinking water is up to 1 ppm as fluoride ion required to make teeth enamel harder by converting $[3Ca_3(PO_4)_2.Ca(OH)_2]$ to:– **$[3Ca_3(PO_4)_2.CaF_2]$**	**[JEE Main-2018]**
Water softening by Clark's process uses– **Calcium hydroxide**	**COMEDK 2018**
The properties of interstitial hydrides is correct?– **They generally form non-stoichiometric species**	**COMEDK 2017**
Identify the structure of water in the gaseous phase– 	**BITSAT-2017**
The statements about water is false– **There is extensive intramolecular hydrogen bonding in the condensed phase**	**[JEE Main-2016]**
Moist hydrogen cannot be dried over (conc.) H_2SO_4 because– **It is oxidised by H_2SO_4**	**JCECE - 2016**
H^+ ion always gets associated with other atoms or molecules due to–	**SCRA-2015**

Search on TG: @apna_pdf

@apna_pdf

small size so that it cannot exist free	
The boiling point of water is exceptionally high because– **Water molecules associate due to hydrogen bonding**	**BITSAT-2012**
Very pure hydrogen (99.9%) can be made by– **Electrolysis of water**	**[AIEEE-2012]**
The property among the following is same for both hydrogen and deuterium molecules is– **Bond length**	**AP-EAMCET- (Engg.)-2011**
The temperature of maximum density of H_2O and D_2O respectively are– **4ºC and 11.6ºC**	**CG PET- 2011**
Hydrogen can have oxidation number/s of– **–1, 0, +1**	**JCECE - 2011**
Hydrogen is prepared on large scale for an industrial use– **from water gas**	**CG PET -2009**
The pairs of substances will not produce hydrogen when reacted together– **Copper and conc. nitric acid**	**Kerala-CEE-2009**
The most abundant element in the universe is thought to be– **hydrogen**	**UPTU/UPSEE-2009**
Electronic configuration of hydride ion is– **$1s^2$**	**UP CPMT-2005**
A propellant for rockets act as a – **Liquid hydrogen + liquid oxygen**	**[AIEEE-2003]**
The reaction produces hydrogen– **Mg + H_2O**	**(AIIMS-2002)**
Bond dissociation energies of HF, HCl, HBr follow the order– **HF > HCl > HBr**	**AP EAMCET- 2001**
Hydrogen has high ionisation energy than alkali metals because it has:– **small size**	**(AIIMS-1999)**
Hydrogen is not more reactive at ordinary temperature, because at ordinary temperature it is in its:– **molecular state**	**(AIIMS-1997)**
Hydrogen gas may be readily prepared in the laboratory by reacting water with– **Sodium**	**AP EAMCET- 1993**
At its melting point, ice is lighter than water because– **ice crystals have hollow hexagonal arrangement of H_2O molecules**	**NEET-1992**
The ionization of hydrogen atom would give rise to– **proton**	**NEET-1990**
Boiling of hard water is helpful in removing the temporary hardness by converting calcium hydrogen carbonate and magnesium hydrogen carbonate to– **$CaCO_3$ and $Mg(OH)_2$**	**JEE Main-26.06.2022, Shift-II**
The temporary hardness of a water sample is due to compound X. Boiling this sample converts X to compound Y. X and Y, respectively, are– **$Mg(HCO_3)_2$ and $Mg(OH)_2$**	**[JEE Main-2019, 12 April Shift-II] [JEE Main-2019, 9 Jan Shift-II]**
Permanent hardness cannot be removed by– **Clark's method**	**Kerala-CEE-29.08.2021 JEE Main-2020, 5 Sep Shift-II**
Used to remove the hardness of water is– **$Na_6P_6O_{18}$**	**AP EAPCET-6 Sep. 2021, Shift-II**
In comparison to the zeolite process for the removal of permanent hardness, the synthetic resins method is– **More efficient as it can exchange both cations as well as anions**	**[JEE Main-2020, 7 Jan Shift-I]**
The method used to remove temporary hardness of water is– **Clark's method**	**NEET-2019**
Permanent hardness of water cannot be removed by - **Boiling**	**NDA (II)-2018**
The ions will cause hardness in water– **Ca^{2+}**	**Karnataka-CET-2018**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

Temporary hardness in water is due to Calcium and Magnesium– **Hydrogencarbonates**	**NDA (I)-2017**
Zeolite (hydrated sodium aluminium silicate) is treated with hard water the sodium ions are exchanged with– **Ca^{2+}ions**	**(AIIMS-2017)**
Permanent hardness of water is due to the presence of:– **sulphates of magnesium and calcium**	**NDA (I)-2015**
The remove temporary hardness of water is – **Slaked lime**	**BITSAT-2015**
The principles of hydrogen bomb is based– **Nuclear fusion**	**CG PET -2004**
The hardness of water is estimated by:– **EDTA method**	**BCECE-2003**
The processes will produce hard water– **Saturation of water with $CaSO_4$**	**[AIEEE-2003]**
The process is used for the removal of hardness of water– **Calgon**	**AP EAMCET- 2001**
Permanent hardness of water is due to– **Both chlorides and sulphates of Ca and Mg**	**AP EAMCET- 1994**
Temporary hardness of water is due to the presence of ..... of calcium and magnesium in water.– **Bicarbonates**	**AP EAMCET- 1993**
The hardness of water samle containing 0.002 mol of magnesium sulphate dissolved in a litre of water is expressed as– **200 ppm**	**Kerala-CEE-2007**

Water and heavy water

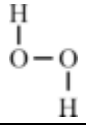
Heavy water is– **D_2O**	**UPTU/UPSEE-2008, 2006 JIPMER-2008, JCECE – 2007 UPCPMT-2007**
The reagent commonly used to determine hardness of water titrimetrically is– **disodium salt of EDTA**	**JCECE - 2012**
Heavy water is not used for drinking because– **Its physiological action is different from ordinary water**	**SCRA-2010**
The value of ..... is less for D_2O compared to that of H_2O.– **Dielectric constant at 20°C**	**AP-EAMCET (Engg.)-2005**
Water gas is essentially a mixture of– **H_2 and CO**	**COMEDK-2020, AMU 2002**
The products formed when heavy water is reacted with magnesium nitride, are– **ND_3, $Mg(OD)_2$**	**AP EAMCET- 2002**
The density of heavy water will be maximum– **11.6 °C**	**AP EAMCET- 1999**
The moderator used in nuclear reactor is– **D_2O**	**UP CPMT-2002**

Hydrogen peroxide

When H_2O_2 reacts with chlorine the product obtained is :– **O_2**	**AP EAMCET (Medical) -1998**
Hydrogen peroxide when added to a solution of potassium permanganate acidified with sulphuric acid:– **Acts as a reducing agent**	**JCECE - 2005**
Hydrogen peroxide is .....– **both an oxidising and a reducing agent**	**AP EAMCET (Engg.) 17.09.2020, Shift-II Karnataka CET-2018**
H_2O_2 cannot oxidise– **O_3**	**Karnataka-CET-2015, BCECE-2007**

Search on TG: @apna_pdf

@apna_pdf

The hydrogen peroxide on reaction with dilute acids is– **Na_2O_2**	**SRMJEEE – 2013 BCECE-2005**
Hydrogen peroxide reacts with iodine in basic medium to give– **I^-**	**[JEE Main-2021, 1 Sep Shift-II]**
The solution produces H_2O_2 on electrolysis– **50% H_2SO_4**	**AP EAPCET 25.08.2021, Shift-II**
The metal oxide gives H_2O_2 on treatment with dilute acid is– **BaO_2**	**AP EAPCET 19-08-2021 Shift-I**
Hydrogen peroxide, in the pure state, is– **Non-planar and almost colourless**	**[JEE Main-2020, 5 Sep Shift-II]**
The chemical nature of hydrogen peroxide is– **Oxidising and reducing agent in both acidic and basic medium**	**[JEE Main-2019, 10 Jan Shift-I]**
The reaction shows oxidizing nature of H_2O_2– **$H_2O_2 + 2KI \rightarrow 2KOH + I_2$**	**BITSAT-2019**
H_2O_2 is obtained by– **BaO_2**	**AIIMS 26 May 2019 (Evening)**
Hydrogen peroxide oxidises $[Fe(CN)_6]^{4-}$ to $[Fe(CN)_6]^{3-}$ in acidic medium but reduces $[Fe(CN)_6]^{3-}$ to $[Fe(CN)_6]^{4-}$ in alkaline medium. The other products formed are, respectively.– **H_2O and $(H_2O + O_2)$**	**[JEE Main-2018]**
Decomposition of hydrogen peroxide can be prevented by adding– **Urea**	**COMEDK 2015**
Moist hydrogen peroxide can not be dried over conc. H_2SO_4 because– **It is decomposed by H_2SO_4**	**JIPMER-2012**
The product (s) formed when H_2O_2 reacts with disodium hydrogen phosphate is– **$Na_2HPO_4 \cdot H_2O_2$**	**AP EAMCET (Engg.) - 2012**
The incorrect in respect of hydrogen peroxide– **It has a linear structure**	**SCRA 2012**
In the reaction $H_2S + H_2O_2 \longrightarrow S + 2H_2O$ – **H_2S is a reducing agent and H_2O_2 is an oxidizing agent**	**Kerala-CEE-2011**
The reduction with hydrogen Peroxide in alkaline medium is– **I_2**	**Kerala-CEE-2010**
The correct statements is for H_2O_2 is– **It acts as a reducing agent in the decolourisation of acidified $KMnO_4$**	**AP – EAMCET (MEDICAL) - 2009**
The reactions represents the oxidizing property of H_2O_2– **$2KI + H_2SO_4 + H_2O_2 \longrightarrow K_2SO_4 + I_2 + 2H_2O$**	**AP EAMCET- 2008**
In the hydrogen peroxide molecule:– **The four atoms are arranged in a non linear and non planar manner**	**BITSAT-2005**
Sodium amalgam is useful as– **Reducing agent**	**AP EAMCET- 1996**
In aqueous solutions, H_2O_2 oxidizes H_2S to– **Sulphur**	**AP EAMCET- 1994**
Hydrogen peroxide molecules are– **monoatomic and form X_2^{2-} ions**	**NEET-1991**
The correct structure of H_2O_2 is – 	**NEET-1989**
The reaction of H_2O_2 with H_2S is an example of ..... reaction– **oxidation**	**NEET-1988**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

14. The s- Block Element

Preparation & Properties of Alkali Metal & Their Compounds

- The elements does not form hydride by direct heating with dihydrogen is– **Be**
- A fire work gave brick red coloured flashes. It contains– **$CaCl_2$**
- The decreasing order of hydration enthalpies of Group II metal ions is–
  $Be^{2+} > Mg^{2+} > Ca^{2+} > Sr^{2+} > Br^{2+}$
- The compounds has the lowest melting point– **CaI_2**
- The metal can displace hydrogen from a very dilute HNO_3– **Magnesium**
- The solubilities of carbonates decrease down the group II due to decrease in–
  Hydration energies of cations
- The alkaline earth metal sulphates is least soluble in water– **$BaSO_4$**
- The product obatined on fusion of $BaSO_4$ and Na_2CO_3 is– **$BaCO_3$**
- A chloride that dissolve appreciably in water. When it is on a Pt wire in Bunsen flame, no specific colour is shown. cation can be present– **Be^{2+}**
- The largest atomic radil– **Magnesium**
- The alkaline earth metal carbonate is thermally the most stable– **$BaCO_3$**
- Does not react with water even under hot condition is **Be**
- The solubilities of Na_2SO_4, $BeSO_4$, $MgSO_4$ and $BaSO_4$ will follow the order–
  $Na_2SO_4 > BeSO_4 > MgSO_4 > BaSO_4$
- The used in cancer-radio therapy– **Radium**
- The hydration energy is higher than the lattice energy– **$MgSO_4$**
- The alkaline earth metals Ba, Sr, Ca and Mg may be arranged in the order of their decreasing first ionisation potential as– **Mg, Ca, Sr, Ba**
- Both Be and A*l* become passive on reaction with concnitric acid due to– **The formation of an inert oxide layer on the surface of the metals**
- BeF_2 is soluble in water whereas fluorides of other alkaline earth metals are insoluble because of–
  Greater hydration energy of Be^{2+} ion as compared to its lattice energy
- When magnesium ribbon is heated to redness in an atmosphere of nitrogen and subsequently cooled with water, the gas evolved is– **NH_3**
- The boiling point of calcium is abnormally high as compare to barium because– **In calcium, d-orbital forms strong metallic bond**
- Property of the alkaline earth metals that increase with their atomic number is–
  Solubility of their hydroxides in water
- The metal carbonates is decomposed on heating?– **$MgCO_3$**
- The correctly represents the general electronic configuration of alkaline earth metals–
  [noble gas]ns^2
- The alkaline earth metals readily react with acids and liberates– **Dihydrogen**
- The present as an active ingredient in bleaching powder for bleaching action– **$Ca(OCl)_2$**
- The metal is found in green colouring pigment chlorophyll of plants– **Mg**
- Initial setting of cement is mainly due to–
  Hydration and gel formation
- $Ca(OH)_2 \xrightarrow[-H_2O]{Cl_2} A \xrightarrow{\text{Auto-Oxidation}} CaCl_2 + B$
  Identify B in the above reaction– **$Ca(ClO_3)_2$**
- The most abundant metal present in the human body is– **Ca**
- Calcium oxide on exposure to atmosphere absorbs–
  Moisture and CO_2
- When CO_2 is passed through lime water it turns milky due to the formation of–
  Calcium carbonate
- The concentration of calcium in plasma is regulated at– **100 mg/L**
- The compound decomposes at highest temperature is– **$BaCO_3$**
- Liberates NH_3 when reacted with water is – **Li_3N, Mg_3N_2 and $CaCN_2$**
- Plaster of paris hardens by– **Uniting with water**
- The nitrates give NO_2 upon strong heating?–**$LiNO_3$, $Be(NO_3)_2$ and $Mg(NO_3)_2$**

TOPSPY

Search on TG: @apna_pdf
@apna_pdf

- Pure anhydrous $MgCl_2$ can be prepared from the hydrated salt by– **Heating the hydrate to red heat in an atmosphere of HCl gas**
- Beryllium differs from rest of the members of its family (Group-IIA) in many ways. The reason for this is its– **Small size and higher electronegativity**
- All the products are same when x and y react with water. x and y are respectively– **Na, NaH**
- Metal which does not react with cold water– **Mg**
- An inorganic solid (X) when heated, it produces a gas produces furbidity in lime water. Same gas is also produced when salt reacts with dil. HCl, (X) is– **$NaHCO_3$**
- $CaCO_3 \xrightarrow{\Delta}$ residue + gas. Residue when dissolves in water, produces– **$Ca(OH)_2$**
- As we move down the group, covalent character decreases, solubility increases and thermal stability increases for **Carbonates of alkali metals**
- The alkali metal has lowest heat of atomization is – **Cs**
- The alkali metal forms bicarbonate only in aqueous solution is – **Lithium**
- The formula of washing soda is– **Na_2CO_3, $10H_2O$**
- Solubility of the alkaline earth metal sulphates in water decreases in the sequence– **Mg > Ca > Sr > Ba**
- Peroxides of alkali metals are– **Diamagnetic**
- On thermal decomposition yields a basic as well as an acidic oxide– **$CaCO_3$**
- In context with beryllium, incorrect statement is **Its salts rarely hydrolyze**
- The reaction of Cl_2 with X gives bleaching powder. X is– **$Ca(OH)_2$**
- The compounds of cement, is present in the highest amount – **Ca_3SiO_5**
- The compounds is most stable– **LiF**
- The compounds is used as a chemical in certain type of fire extinguishers is – **Baking Soda**
- In hydrated beryllium salt, the number of H_2O molecules never exceeds– **4**
- What is X in the equation $CaO + 3C \xrightarrow{3273K} X + CO$ **–CaC_2**
- The largest value of K_{sp} is. **$BeSO_4$**
- The chemical formula of lime water is – **$Ca(OH)_2$**
- The ease of adsorption of the hydrated alkali metals ions on an ion-exchange resin the order–**$Rb^+ < K^+ < Na^+ < Li^+$**
- Ionic conductances of hydrated M^+ ions are in the order– **$Li^+(aq) < Na^+(aq) < K^+(aq) < Rb^+(aq) < Cs^+(aq)$**
- The alkali metals are low melting. Alkali metals is expected to melt if the room temperature rises to 30°C– **Cs**
- Alkali metals react with water vigorously to form hydroxides and dihydrogen. Alkali metals reacts with water least vigorously **Li**
- The reducing power of a metal depends on various factors. Suggest the factor which makes Li, the strongest reducing agent in queous solution– **Hydration enthalpy**
- Metal carbonates decompose on heating to give metal oxide and carbon dioxide. Metal carbonates is most stable thermally– **$BaCO_3$**
- The carbonates given below is unstable in air and is kept in CO_2 atmosphere to avoid decomposition– **$BeCO_3$**
- Metals form basic hydroxides. metal hydroxide is the least basic– **$Mg(OH)_2$**
- The order of decreasing ionisation enthalpy in alkali metals is– **Li > Na > K > Rb**
- When sodium is dissolved in liquid ammonia, a solution of deep blue colour is obtained. The colour of the solution is due to– **Ammoniated electron**
- By adding gypsum to cement– **Settting time of cement increases**
- Dead burnt plaster is– **$CaSO_4$**
- Suspension of slaked lime in water is known as– **Milk of lime**
- The statements is true about $Ca(OH)_2$?–**It is used in the preparation of bleaching power**
- The formula of soda ash is– **Na_2CO_3**
- A substance which gives brick red flame and breaks down on heating to give oxygen and a brown gas is– **Calcium nitrate**
- The structure of beryllium chloride in solid state and vapour phase, are– **Chain and dimer, respectively**
- The alkaline earth metal halides, one is covalent and soluble in organic solvents is– **Chain and dimer, respectively**
- The alkaline earth metal halides, one is covalent and soluble in organic solvents is– **Beryllium chloride**
- The metal ion activates many enzymes, participates in the oxidation of glucose to produce ATP and with Na, is responsible for the transmission of nerve signals.– **Potassium**
- An amphoteric hydroxide is **$Be(OH)_2$**
- Enzymes that utilize ATP in phosphate transfer require an alkaline earth metal (M) as the cofactor M is– **Mg**
- The oxides is most acidic in nature– **BeO**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

- In CaH_2, BeH_2, BaH_2 the order of ionic character is– **$BeH_2 < CaH_2 < BaH_2$**
- Magnesium reacts with an element (X) to form an ionic compound. If the ground state electronic configuration of (X) is $1s^2\ 2s^2\ 2p^3$, the simplest formula for this compound is– **Mg_3X_2**
- The mobility of the alkali metal ions in aqueous solution is– **$Rb^+ > K^+ > Na^+ > Li^+$**
- The alkali metals, forms only, the normal oxide, M_2O on heating in air– **Li**
- First ionisation energy of alkali metals is very low but second ionisation energy is very high because– **Alkali metals acquire noble gas configuration after losing one electron**
- The mobilities of the alkali metal ions in aqueous solution are $Li^+ < Na^+ < K^+ < Rb^+ < Cs^+$ because– **Greater is the degree of hydration, lesser is the mobility in aqueous medium**
- The characteristic flame colouration of Li is– **Crimson red**
- The alkali metal which when burnt in air forms a mixture of oxide as well as nitride– **Li**
- A metal M reacts with nitrogen to give nitride which on reaction with water produces ammonia gas. Metal M can be– **Li**
- When sodium reacts with excess of oxygen, the oxidation number of oxygen changes from– **0 to –1**
- In all oxides, peroxides and superoxides, the oxidation state of alkali metals is– **+1 only**
- When sodium is dropped in small amount of water it catches fire. The burns in the process is– **H_2**
- When H_2 is passed over lithium at 1073 K, the compound formed is –**Ionic lithium hydride is formed**
- Lithium is the strongest reducing agent though it has highest ionisation energy in its group. The factors responsible for making Li the strongest reducing agent – **Large amount of hydration enthalpy**
- On reaction with dihydrogen the alkali metals form– **hydrides which are ionic solids with high melting points**
- Superoxides of alkali metals act as oxidising agents while normal oxides are basic in nature. The oxide which is paramagnetic in nature due to presence of unpaired electron are–**Superoxides of alkali metals**
- Crystalline sodium chloride is a bad conductor of electricity while molten NaCl and its aqueous solution conduct electricity. This is because– **The ions present in it are not free to move in solid state**
- Li_2CO_3 Lowest thermal stability has– **Lowest thermal stability**
- Sodium is heated in air at 300^0C to form X. X absorbs CO_2 and forms Na_2CO_3 and Y. Y is– **O_2**
- The properties of lithium are similar to those of Mg. This is because– **The ratio of their charge to size is nearly the same**
- Lithium salts are mostly hydrated like $LiCl\text{-}2H_2O$ due to– **Maximum degree of hydration of Li^+**
- The nitrate which decompose to give NO_2 on heating– **$LiNO_3$**
- In Solvay ammonia process, sodium bicarbonate is precipitated due to– **Reaction with brine solution**
- K_2CO_3 cannot be prepared by Solvay's process because– **$KHCO_3$ is more soluble to be precipitated by KCl and NH_4HCO_3**
- The raw materials used in Solvay's process– **NaCl, NH_3, $CaCO_3$**
- When washing soda is heated– **Water vapour is released**
- Baking soda is– **$NaHCO_3$**
- The biological importance of Na^+ and K^+ ions in cell fluids like blood plasma– **They participate in transmission of nerve signals**
- Ca^{2+} is isoelectronic with– **Ar**
- The decreasing order of the second ionization potential of Mg, Ca and Ba is– **Mg > Ca > Ba**
- The formula of hydrated $BeCl_2$ is– **$BeCl_2.4H_2O$**
- An oxide of alkaline earth metals X reacts with C and Cl_2 to give a compound Y. Y is found in polymeric chain structure and is electron deficient molecule. the compound Y is– **$BeCl_2$**
- The increasing order of basic character of oxides MgO, SrO, K_2O and Cs_2O is– **MgO < SrO < K_2O < Cs_2O**
- Calcium chloride is used as a dehydrating agent because– **It has a strong affinity for water**
- BeO is insoluble but BaO is soluble as– **Lattice energy of BeO is higher than BaO due to small size of Be^{2+} ion and its covalent nature**
- The pair of amphoteric oxides is– **BeO, ZnO**
- When $BeCl_2$ is hydrolysed, white fumes of gas are given out. The intensity of fumes intensifies when a rod dipped in moist ammonia is brought near the mouth of the test tube. The gas which comes out during hydrolysis is– **HCl**
- The reaction produces hydrogen– **Mg + H_2O**
- Sulphates of Be and Mg are readily soluble in water but sulphates of Ca, Sr and Ba are insoluble. This is due to the fact– **The greater hydration enthalpies of Be^{2+} and Mg^{2+} overcome the lattice enthalpy**
- The correct order of the solubility of sulphates of alkaline earth metals in water is– **Be > Mg > Ca > Sr > Ba**

Search on TG: @apna_pdf

@apna_pdf

- When plaster of Paris comes in contact with water it sets into a hard mass. The composition of the hard mass is– **$CaSO_4 .2H_2O$**
- For a good quality cement, the ratio of silica (SiO_2) to alumina (Al_2O_3) should lie between– **2.5 - 4**
- The difference of water molecules in gypsum and plaster of Paris is– **$1\frac{1}{2}$**
- The formula of calcium cyanamide is– **CaNCN**
- The metal ion, that plays an important role in muscle contraction, is– **Ca^{2+}**
- Alkali metals react with water vigorously to form hydroxides and dihydrogen. The alkali metals reacts with water least vigorously is– **Li**
- The carbonates is unstable in air and is kept in CO_2 atmosphere to avoid decomposition is– **$BeCO_3$**
- Metals form basic hydroxides. The metal hydroxide least basic is– **$Sr(OH)_2$**
- Some of the group 2 metal halides are covalent and soluble in organic solvents. Among the metal halides, the one soluble in ethanol is– **$BeCl_2$**
- The order of decreasing ionisation enthalpy in alkali metals is– **Li > Na > K > Rb**
- Amphoteric hydroxides react with both alkalies and acids. The group 2 metal hydroxides soluble in sodium hydroxide is – **$Be(OH)_2$**
- In the synthesis of sodium carbonate, the recovery of ammonia is done by treating NH_4Cl with $Ca(OH)_2$. The by-product obtained in this process is– **$CaCl_2$**
- By adding gypsum to cement– **Setting time of cement increases**
- Dead burnt plaster is– **$CaSO_4$**
- Suspension of slaked lime in water is known as– **Milk of lime**
- The formula of soda ash is– **Na_2CO_3**
- A substance which gives brick red flame and breaks down on heating to give oxygen and a brown gas is– **Calcium nitrate**
- A s-block element (M) reacts with oxygen to form an oxide of the formula MO_2. The oxide is pale yellow in colour and paramagnetic. The element (M) is– **K**
- Portland cement contains 'X' to enhance the setting time. 'X' is– **$CaSO_4 \cdot 2H_2O$**
- The structures of beryllium chloride in solid state and vapour phase are–**Chain and dimer, respectively**
- The metal ion activates many enzymes, participates in the oxidation of glucose to produce ATP and with Na. Metal is responsible for the transmission of nerve signals is – **Potassium**
- Among the alkaline earth metal halides one which is covalent and soluble in organic solvents is– **Beryllium chloride**
- The order of conductivity of ions in water is– **$Cs^+ > Rb^+ > K^+ > Na^+$**
- The alkali metal which during flame test show colour corresponding to maximum wavelength is–**Li**
- In KO_2, the nature of oxygen species and the oxidation state of oxygen atom are, respectively– **Superoxide and –1/2**
- The alkali metal chloride (MCl) forms its dihydrate salt ($MCl.2H_2O$) easily is– **LiCl**
- Crude sodium chloride obtained by crystallisation of brine solution does not contain– **$MgSO_4$**
- Magnesium powder burns in air to give– **MgO and Mg_3N_2**
- The suspension of slaked lime in water is known as– **Milk of lime**
- The colourless salt produces violet colour to Bunsen flame and turns moist litmus paper blue, the substance is– **K_2CO_3**
- The highly reactive alkali metals are kept in–**Kerosene**
- The alkali halide that is soluble in pyridine is– **LiCl**
- The action of water on Na_2O_2 is – **O_2**
- Sodium carbonate is manufactured by Solvay process, the products that are recycled are– **CO_2 and NH_3**
- ..... is a representative element– **Sr**
- ..... alkali metals is the most metallic– **Cs**
- The metallic luster exhibited by sodium is due to– **Oscillation of loose electrons**
- ..... ions has the largest size in aqueous solution– **Li^+**
- The strongest reducing agent is– **K**
- Sodium chloride gives a golden yellow colour to the bunsen flame, due to– **Emission of excess of energy absorbed as a radiation in the visible region**
- ..... oxides is the most basic in nature– **Na_2O**
- ..... hydride is the most stable– **LiH**
- ..... hydroxide decomposes on heating– **LiOH**
- The polarizing power of magnesium is nearly same as– **Lithium**
- The ..... halides has the highest melting point– **NaF**
- The ..... metals is most commonly used in photochemical cells– **Caesium**
- ..... is an amphoteric oxide– **BeO**
- ..... give oxide on strong heating– **$LiNO_3$**
- ..... shows the tendency to form peroxide– **Ba**
- The solubility order of the chlorides of the alkali metals is– **CsCl > RbCl > NaCl > KCl**
- The thermal stability order of the carbonates is– **$K_2CO_3 > Na_2CO_3 > BaCO_3 > BeCO_3$**
- Sodium is usually kept under– **Kerosene oil**
- On heating sodium hydrogen carbonate, the products formed are– **$Na_2CO_3 + H_2O + CO_2$**
- Ionic mobility of the ..... alkali metal ions is lowest when aqueous solution of their salts are put under an electric field– **Li**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

- The alkali metal form salt-like hydride by the direct synthesis at elevated temperature. The thermal stability of these hydrides decrease in orders is. **LiH > NaH > KH > RbH > CsH**
- The alkali metals form only the normal oxide, M_2O on heating in air is– **Li**
- The least stable carbonate of alkali metal is–**Li_2CO_3**
- Compared with the alkaline earth metals, the alkali metals exhibit– **Lower ionization energies**
- The alkali metals give hydrated salts is– **Li**
- In the reaction, $M + O_2 \rightarrow MO_2$ (superoxide), the metal (M) is– **Potassium**
- In the case of alkali metals, the covalent character decrease in the order– **MI > MBr > MCl > MF**
- Does not give an oxide on heating is– **K_2CO_3**
- The solution of sodium metal in liquid ammonia is strongly reducing due to the presence of– **Solvated electrons**
- The alkali metals, lithium alone forms a nitride because,– **The small size Li^+ and a large lattice energy**
- The properties of alkali metals increases in magnitude as the atomic number increases– **Ionic radius**
- The ionic mobility of alkali metal ions in aqueous solution is maximum for– **Rb^+**
- The yellow colour flame is of– **Na**
- The products obtained on heating $LiNO_3$ will be– **$Li_2O + NO_2 + O_2$**
- The correctly represents the general electronic configuration of alkali metals **[noble gas]ns^1**
- The largest ionic radius– **Rb**
- The components of baking soda is– **$NaHCO_3$**

Important Compounds of Na and Biological Importance of Na & K

- In the synthesis of sodium carbonate, the recovery of ammonia is done by treating NH_4Cl with $Ca(OH)_2$. The by product obtained in this process is– **$CaCl_2$**
- NaOH is prepared by method–**Castner-Kellner cell**
- The first ionisation energies of alkaline earth metals are higher than those of the alkali metals because– **There is increase in the nuclear charge of the alkaline earth metals**
- The most electropositive metal among the alkalis earth metal is– **Ba**
- Lime water is an aqueous solution of– **$Ca(OH)_2$**
- The ..... chlorides has maximum tendency to form hydrate– **$MgCl_2$**
- Setting of Plaster of Paris involves– **Hydration**
- The ..... compounds is the most soluble in water– **$Ba(OH)_2$**
- Solvay's process is used for the manufacture of– **Washing soda**
- In the manufacture of sodium hydroxide, by product obtained is– **Cl_2**
- In the preparation of sodium carbonate (Na_2CO_3) the ..... is used as raw material– **Brine**
- Baking soda is– **$NaHCO_3$**
- Stable oxide is obtained by heating the carbonate of the elements– **Li**
- The suspension of slaked in water is known as– **Milk of lime**
- The sodium is made by the electrolysis of a molten mixture of about 40% NaCl and 60% $CaCl_2$ because– **This mixture has a lower melting point than NaCl**
- Calcium is obtained by– **Electrolysis of molten anhydrous calcium chloride**
- In Castner-Kelliner cell for production of sodium hydroxide– **Sodium amalgam is formed at mercury cathodes**
- The thermal stability of alkaline earth metal carbonates increases from Be to Ba, this is because– **Covalent nature decreases and ionic nature increases**
- The solubility of sulphates in water decreases from $MgSO_4$ to $BaSO_4$. It is due to the fact that– **Hydration enthalpy of M^{2+} ions decreases**
- Metallic Magnesium is prepared by– **Electrolysis of molten $MgCl_2$**
- Molecular formula of Glauber's salt is– **$Na_2SO_4 \cdot 10H_2O$**
- The electrolysis of molten $KCl \cdot MgCl_2 \cdot 6H_2O$ gives– **Mg and Cl_2**
- Compared with the alkaline earth metals, the alkali metals show– **Lower ionization energy**
- The oxides of group 2, least basic is– **MgO**
- Beryllium on ignition in air gives– **BeO, Be_3N_2**
- Solubility of the alkaline earth's metal sulphates in water decreases in the sequence– **Mg > Ca > Sr > Ba**
- The ..... alkaline earth metal sulphates has hydration enthalpy higher than the lattice enthalpy– **$BeSO_4$**
- Property of the alkaline earth metals that increases with their atomic number– **Solubility of their hydroxides in water**
- The chemical formula of caustic soda is– **NaOH**
- The solubility in water of sulphate down the Be group is Be > Mg > Ca > Sr > Ba. This is due to– **High heat of salvation for smaller ions like Be^{2+}**
- Epson salt's chemical formula is– **$MgSO_4 \cdot 7H_2O$**
- The ..... compounds is a peroxide– **BaO_2**
- Dead burnt plaster is– **$CaSO_4$**
- Formula of Gypsum is– **$CaSO_4 \cdot 2H_2O$**
- ..... compounds has the lowest melting point–**CaI_2**

Search on TG: @apna_pdf
@apna_pdf

- The ..... is present as an active ingredient in bleaching powder for bleaching action– **$Ca(OCl)_2$**
- Alkali metals are not found in free state due to their highly reactive nature. This is due to–
  Their large size and low ionisation enthalpy
- The ionisation energy of alkali metals decreases from Li to Cs because– **The atomic size increases from Li to Cs**
- Sodium carbonate is manufactured by–
  Solvay's process
- In the reaction of NaH with water, is present of.-**OH**
- When washing soda is heated–
  Water vapour is released
- In the Solvay process of manufacture of sodium carbonate, the rawmaterials used are–
  Brine NaCl, NH_3 and CO_2
- The uses of sodium chloride–
  It is used for the preparation of Na_2CO_3
- Sodium chloride has a solubility of–
  36.0 g in 100 g of water at 273 K
- The incorrect about the biological function of sodium ions– **These ions do not participate in the transmission of nerve signals**

EXAM POINT

Preparation and properties of alkali metal and their compound.

The product obtained as a result of a reaction of nitrogen with CaC_2 is– **$Ca(CN)_2$**	**NEET-I 2016**
Magnesium reacts with an element (X) to form an ionic compound. If the ground state electronic configuration of (X) is $1s^2\ 2s^2\ 2p^3$, the simplest formula for this compound is– **Mg_3X_2**	**NEET-2018**
Compared with the alkaline earth metals, the alkali metals exhibit– **Lower ionization energies**	**NEET-1990**
The structures of beryllium chloride in solid state and vapour phase are– **Chain and dimer, respectively**	**NEET-2021**
Among CaH_2, BeH_2, BaH_2, the order of ionic character is– **$BeH_2 < CaH_2 < BaH_2$**	**NEET-2018**
Solubility of the alkaline earth metal sulphates in water decreases in the sequence– **Mg > Ca > Sr > Ba**	**NEET-2016**
The correct order of increasing thermal stability of K_2CO_3, $MgCO_3$, $CaCO_3$ and $BeCO_3$ is– **$BeCO_3 < MgCO_3 < CaCO_3 < K_2CO_3$**	**NEET-2007**
The solubility in water of sulphate down the Be group is Be > Mg > Ca > Sr > Ba. This is due to– **High heat of salvation for smaller ions like Be^{2+}**	**NEET-1995**
Crude sodium chloride obtained by crystallization of brine solution does not contain– **$MgSO_4$**	**NEET-Odisha 2019**
Element with atomic number 38. Belongs to– **II A group and 5th period**	**UP CPMT-2008**
Blue vitriol is– **$CuSO_4 \cdot 5H_2O$**	**UP CPMT-2006**
Bleaching action of $CaOCl_2$ is due to– **Nascent oxygen**	**UPTU/UPSEE-2014, UP CPMT-2006**
The chemical which is used for plastering the broken bones is– **$(CaSO_4)_2\ H_2O$**	**UPTU/UPSEE-2009**
Diacidic base is– **$Ca(OH)_2$**	**UPTU/UPSEE-2009**
Plaster of Paris on making paste with little water sets to hard mass due to formation of– **$CaSO_4 \cdot 2H_2O$**	**UPTU/UPSEE-2008**
Chlorine gas reacts with red hot calcium oxide to give– **Calcium chloride and oxygen**	**WB-JEE-2013**
The decreasing order of basic character of K_2O, BaO, CaO and MgO is– **$K_2O > BaO > CaO > MgO$**	**WB-JEE-2015**
If radium and chlorine combine to form radium chloride, the compound would be– **As radioactive as radium**	**WB-JEE-2016**
In the flame test of a mixture of salts, a green flame with blue centre was observed. - **Cu^{2+}**	**JEE Main-24.06.2022, Shift-II**

TEAM SPY

Search on TG: @apna_pdf
@apna_pdf

The correct order of melting point is:– **Be > Ca > Sr > Mg**	**JEE Main-26.06.2022, Shift-I**
Nitrogen gas is obtained by thermal decomposition of– **$Ba(N_3)_2$**	**JEE Main-28.06.2022, Shift-I**
The elemental forms is not present in the enamel of the teeth– **P^{3+}**	**JEE Main-24.06.2022, Shift-I**
Addition of H_2SO_4 to BaO_2 produces:– **$BaSO_4$ and H_2O_2**	**JEE Main-27.06.2022, Shift-I**
$BeCl_2$ reacts with $LiAlH_4$ to give:– **$BeH_2 + LiCl + AlCl_3$**	**JEE Main-27.06.2022, Shift-I**
The alkaline earth metal ions has the highest ionic mobility in its aqueous solution– **Be^{2+}**	**JEE Main-25.06.2022, Shift-I**
A white precipitate was formed when $BaCl_2$ was added to water extract of an inorganic salt. Further, a gas 'X' with characteristic odour was released' when the formed white precipitate was dissolved in dilute HCl. The anion present in the inorganic salt is.– **SO_3^{2-}**	**JEE Main-29.06.2022, Shift-II**
Anhydrone is:– **$Mg(ClO_4)_2$**	**CG PET-22.05.2022**
The basic oxide is:– **CaO**	**JEE Main-28.06.2022, Shift-II**
Besides SiO_2 and Al_2O_3, the other major ingredient in portland cement is– **Lime**	**AP EAMCET- 1991**
Mg is mainly extracted from– **Magnesite**	**AP EAMCET- 1992**
The chemical formula of bleaching powder is– **Ca(OCl)Cl**	**AP EAMCET- 1993**
Quicklime is represented by the formula– **CaO**	**AP EAMCET- 1993**
The compound formed during the setting of the plaster of Paris is– **Gypsum**	**AP EAMCET- 1995**
Super phosphate is a mixture of– **$Ca(H_2PO_4)_2.H_2O+2CaSO_4.2H_2O$**	**AP EAMCET- 1996**
The gypsum is dissolved in aqueous ammonium sulphate solution, is– **$CaSO_4.(NH_4)_2SO_4.2H_2O$**	**AP EAMCET- 2002**
The products formed, when an aqueous solution of magnesium bicarbonate is boiled?– **MgO, H_2O, CO_2**	**AP EAMCET- 2003**
In the hardening stage of Plaster of Paris, the compound formed is– **Monoclinic $CaSO_4 \cdot 2H_2O$**	**AP EAMCET- 2004**
The cations gives a brick red flame by flame test– **Ca^{2+}**	**MPPET- 2009**
Partial dehydration of gypsum at around 150°C affords mainly– **$CaSO_4.\frac{1}{2}H_2O$**	**S. C. R. A - 2014**
Bubbling of CO_2 through lime water results in a turbid solution. This is due to formation of– **$CaCO_3$**	**S. C. R. A - 2014**
The chemicals is used as washing soda– **Sodium carbonate**	**NDA (II)-2017**
The gypsum is heated between 100° C to 120° C, it losses– **three-fourth of its water of crystallization**	**SCRA-2010**
The metal constituent of chlorophyll is– **Magnesium**	**NDA (II)-2011**
Incorrect form bleaching powder– **It is used as a reducing agent in chemical industries**	**NDA (I)-2018**
The chemical formula of gypsum?– **$CaSO_4.2H_2O$**	**NDA (II)-2018**
The metals does not react with cold water– **Magnesium (Mg)**	**NDA (I)-2019**

Search on TG: @apna_pdf

@apna_pdf

The raw materials used for the manufacture of Portland cement are– **Lime, silica and alumina**	**NDA (II)-2019**
In the reaction $I_2 + H_2O + Cl_2 \rightarrow X + Y$, the products X and Y respectively are _____– **HIO_3 , HCl**	**AP EAPCET 23-08-2021 Shift-I**
The metals produces Hydrogen gas on reacting with cold dilute Nitric acid– **Mg**	**AP-EAMCET 25-08-2021 Shift - I**
The alkaline earth sulphate, its hydration enthalpy greater than its lattice energy is– **$BeSO_4$**	**TS-EAMCET (Engg.), 05.08.2021 Shift-II**
Tincture of iodine is the common name for– **2-3% iodine solution in alcohol-water**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
The tendency of forming chloride hydrates of alkaline earth metals is in the order of ———— **Mg > Ca, Sr > Ba**	**AP EAPCET 25.08.2021, Shift-II**
Reaction of calgon with hard water containing Ca^{2+} ions produce-**$[Na_2CaP_6O_{18}]^{2-}$**	**TS EAMCET-2017**
Bleaching powder can be obtained by reactions?– **$Ca(OH)_2 + Cl_2 \xrightarrow{\Delta} CaOCl_2 + H_2O$**	**AP EAPCET 24.08.2021 Shift-II**
The metal ion play an important role in muscle contraction– **Ca^{2+}**	**AP EAPCET 24.08.2021, Shift-I**
The main constituent of enamel on the surface of teeth is:– **$[3Ca_3(PO_4)_2 \cdot Ca(OH)_2]$**	**AP EAPCET 20.08.2021 Shift-II**
The experimentally determined molar mass of a non-volatile solute, $BaCl_2$ in water by Cottrell's method, is– **less than the calculated molar mass**	**AP EAMCET (Engg.) 2012**
The substances is used, in laboratory, for fast drying of neutral gases– **Anhydrous calcium chloride**	**COMEDK 2016**
The correct increasing basic strength– **BeO < MgO < CaO < BaO**	**COMEDK 2016**
Mg is an important component of– **chlorophyll**	**COMEDK-2015**
An epsom salt is – **$MgSO_4 . 7H_2O$**	**COMEDK-2020**
The compounds helps in achieving equilibrium between O_2 and CO_2(g) in atmosphere?– **Chlorophyll**	**AP-EAMCET (Medical), 2008**
The correct order for the decomposition temperature of $CaCO_3$(X), $MgCO_3$(Y) and $BaCO_3$ (Z)?– **Z > X > Y**	**AP-EAMCET (Medical), 2002**
Powdered Berilium burns in air to give– **BeO; Be_3N_2**	**TS EAMCET 05.08.2021, Shift-I**
$MgCl_2 . 6H_2O$ heated gives– **Magnesium oxide**	**AIIMS-1994**
Hydrolysis of beryllium carbide produces– **methane**	**AIIMS-1996**
In the reaction sequence: $CaC_2 \xrightarrow{H_2O} A \xrightarrow[H_2SO_4]{dil.H_2SO_4} B \xrightarrow{H_2/Ni} C$, the term 'C' is– **$C_2H_5OH$**	**AIIMS-1996**
The hydrides is more acidic– **H_2Te**	**AP EAMCET (Medical) - 1998**
Nitrolium is a mixture of :– **Ca CN_2 and graphite**	**AP EAMCET (Medical) - 1998**
The product of reaction: $Ba(OH)_2 + H_2O_2 + ClO_2 \longrightarrow$(dilute) – **$Ba(ClO_2)_2$**	**(AIIMS-27 May, 2018-Morning)**
The correct sequence of increasing melting points of $BeCl_2$, $MgCl_2$, $CaCl_2$, $SrCl_2$ and $BaCl_2$ is– **$BeCl_2 < MgCl_2 < CaCl_2 < SrCl_2 < BaCl_2$**	**(AIIMS-2011)**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

The alkaline earth metals shows some anomalous behaviour and has the same electronegativity as aluminium?– **Be**	**(AIIMS-2011)**
The hydroxide is insoluble in water– **$Be(OH)_2$**	**(AIIMS-2001)**
Mg is an important component of which biomolecule occurring extensively in living world?– **Chlorophyll**	**VITEEE- 2010**
Diamond is hard because– **all the four valence electrons are bonded to each carbon atoms by covalent bonds**	**VITEEE- 2008**
The reactions does not occur– **$BaO + O_3 \longrightarrow BaO_2 + O_2$**	**AP - EAMCET(MEDICAL) - 2009**
$BaSO_4$ is insoluble in water due to its– **high lattice energy**	**AP - EAMCET(MEDICAL) - 2009**
Element with atomic number 38, belongs to– **II A group and 5^{th} period**	**AP - EAMCET (Medical) - 2007**
Philosopher's wool heated with BaO at 1100°C gives a compound. Identify the compound.– **$BaZnO_2$**	**SRMJEEE-2014**
The oxides is most acidic in nature?– **BeO**	**AMU – 2009**
Zinc phosphide and barium carbonate are well known– **rhodenticides**	**AMU–2003**
Dolomite constitutes– **$MgCO_3$, $CaCO_3$**	**AMU–2003**
The wire in the flash bulbs is made up of– **Mg**	**AMU 2002**
'Blue john' is – **CaF_2**	**AMU 2002**
Mortar is a mixture of slaked lime and sand in the ratio– **1 : 3**	**AMU 2002**
The carbonates is least soluble in water?– **$CaCO_3$**	**AMU 2002**
The order of hydration enthalpies of alkaline earth metal ions– **$Be^{2+} > Mg^{2+} > Ca^{2+} > Sr^{2+}$**	**Assam CEE-2019**
On heating ammonium dichromate and barium azide separately, we get– **N_2 in both cases**	**Assam CEE-2018**
The chemical formula of Plaster of Paris is– **$CaSO_4 \times \frac{1}{2} H_2O$**	**JIPMER-2008, 2018 Karnataka-CET-2017 BCECE-2007, 2010 JCECE-2007 UPTU/UPSEE-2005 (AIIMS-2000) AP EAMCET-1993**
The radicals gives the apple green flame during flame test? **$-Ba^{2+}$**	**BCECE-2006**
Important ore of Mg is:– **Carnallite**	**BCECE-2005**
On strong heating $MgCl_2.6H_2O$, the product obtained is:– **MgO**	**BCECE-2004**
The salt responsible for permanent hardness of H_2O is– **$MgCl_2$**	**BCECE-2009**
The least ionic chloride is formed by– **Be**	**BCECE-2009**
Colemanite is– **$Ca_2B_6O_{11} \times 5H_2O$**	**BCECE-2011**
The value of x is maximum for– **$MgSO_4.xH_2O$**	**BCECE-2011 BITSAT-2009**

Search on TG: @apna_pdf

@apna_pdf

When NH_3 is passed over heated metal A. Its amide is formed. The metal is– **K**	**[BITSAT-2013]**
Portland cement does not contain– **$Ca_3(PO_4)_2$**	**BITSAT-2008, 2017**
The correct increasing basic strength– **BeO < MgO < CaO < BaO**	**BITSAT-2012**
BeF_2 is soluble in water whereas fluorides of other alkaline earth metals are insoluble because of– **Covalent nature of BeF_2**	**BITSAT-2020**
The alkaline earth metal hydroxides in amphoteric in character?– **$Be(OH)_2$**	**BITSAT-2019**
Dead burnt plaster is– **$CaSO_4$**	**Karnataka-CET-2018 BITSAT-2017**
The substance not likely to contain $CaCO_3$ is– **Calcined gypsum**	**CG PET- 2013**
The molecular formula of bleaching powder is– **$CaOCl_2$**	**CG PET -2007 JIPMER-2006**
Calcium carbide reacts with water to produce– **Acetylene**	**CG PET -2004**
In the reaction $3Mg + N_2 \rightarrow Mg_3N_2$ – **Magnesium is oxidised**	**CG PET -2004**
When Zeolite is hydrated sodium aluminum silicate is treated with hard water, the sodium ions are exchanged with ions is– **Mg^{2+}**	**HP CET-2018**
The alkaline earth metal sulphates has its hydration enthalpy greater than its lattice enthalpy?– **$BeSO_4$**	**[JEE Main-2015]**
The thermal decomposition yields a basic as well as acidic oxide– **$CaCO_3$**	**[AIEEE-2012]**
One mole of magnesium nitride on reaction with an excess of water gives– **Two moles of ammonia**	**[AIEEE-2004]**
The solubilities of carbonates decrease down the magnesium group due to a decrease in– **Hydration energies of cations**	**[AIEEE-2003]**
The substance used in Holmes signals of the ship is a mixture of– **$CaC_2 + Ca_3P_2$**	**[AIEEE-2003]**
A metal M forms water soluble sulphate MSO_4 and inert MO. MO in aqueous solution forms insoluble $M(OH)_2$, which is soluble in NaOH. Metal M is– **Be**	**[AIEEE-2002]**
The correct sequence of thermal stability is– **$MgCO_3 < CaCO_3 < SrCO_3 < BaCO_3$**	**[JEE Main-2019, 12 April Shift-I]**
The alkaline earth metal nitrate that does not crystallise with water molecules, is– **$Ba(NO_3)_2$**	**[JEE Main-2019, 9 Jan Shift-I]**
The metal used for making X-ray tube window is– **Be**	**[JEE Main-2019, 10 Jan Shift-I]**
The amphoteric hydroxide is– **$Be(OH)_2$**	**[JEE Main-2019, 11 Jan Shift-I]**
When gypsum is heated to 393 K, it forms:– **$CaSO_4.\ 0.5H_2O$**	**[JEE Main-2020, 8 Jan Shift-I]**
The covalent alkaline earth metal halide (X = Cl, Br, I) is– **BeX_2**	**[JEE Main-2019, 8 April Shift-II]**
Magnesium powder burns in air to give– **MgO and Mg_3N_2**	**[JEE Main-2019, 9 April Shift-I]**
The structures of beryllium chloride in the solid state and vapour phase, respectively are– **chain and dimeric**	**[JEE Main-2019, 9 April Shift-II]**
The major component/ ingredient of Portland cement is– **tricalcium silicate**	**[JEE Main-2021, 31 Aug Shift-I]**
The number of water molecules in gypsum, dead burnt plaster and plaster of	**[JEE Main-2021, 27 Aug**

TEAM SPM

Search on TG: @apna_pdf

Paris, respectively are– **2, 0 and 0.5**	**Shift-I]**
The products formed in sequence when excess of CO_2 is passed in slaked lime?–**C**	**[JEE Main-2021, 26 Aug Shift-I]**
The conversion of hydroxyapatite occurs due to presence of F^- ions in water. The correct formula of hydroxyapatite is– **$[3Ca_3(PO_4)_2Ca(OH)_2]$**	**[JEE Main-2021, 26 Aug Shift-I]**
One of the by-products formed during the recovery of NH_3 from solvay process is– **$CaCl_2$**	**JEE Main-2021, 17 March Shift-II BITSAT-2015**
The amphoteric compounds is…….– **BeO**	**[JEE Main-2021, 24 Feb Shift-I]**
The element with Z = 120 (not yet discovered) will be an/a– **alkaline earth metal**	**(JEE Main 2019, 12 Jan Shift-I)**
The alkaline earth metal sulphate which is most soluble in water among the following is– **$BeSO_4$**	**J & K CET-(2016)**
The powdered plaster of Paris is mixed with correct amount of water it sets into a solid mass of– **$CaSO_4.2H_2O$**	**J & K CET-(2015)**
Calcium carbide on reaction with water yields– **Acetylene**	**J & K CET-(2005) J & K CET-(2014)**
The carbonate decompose most easily on heating– **$MgCO_3$**	**JCECE - 2003**
	JCECE - 2006 MHT CET-2012
$CaC_2 + N_2 \rightarrow$ A, product A is– **$CaCN_2$ and C**	**JCECE - 2008**
The alkaline earth metal sulphates has hydration enthalpy higher than the lattice enthalpy?– **$BeSO_4$**	**JCECE - 2015**
The present as an active ingredient in bleaching powder for bleaching action– **$Ca(OCl)_2$**	**JIPMER-2014**
The compounds has the lowest melting point?– **CaI_2**	**JIPMER-2014**
The metal carbonates decomposes on heating?– **$MgCO_3$**	**JIPMER-2012**
BaO_2 and ozone reacts to produce– **BaO**	**JIPMER-2008**
The elements, is a component of a compound essential for photosynthesis?– **Magnesium**	**JIPMER-2004**
Beryllium differs in properties from other elements of its own group but shows resemblance with aluminium because of– **relatively smaller ionic radius and high polarising power of Be**	**JIPMER-2016**
The third ionization enthalpy is highest in– **Alkaline earth metals**	**Karnataka-CET-2021**
The characteristic colours given by calcium, strontium and barium in the flame test are respectively:– **Brick red, crimson, apple green**	**Kerala-CEE-2004**
The alkaline earth metal with the least density value is– **Ca**	**Kerala-CEE-2012**
When CO_2 is passed through solution of calcium hydroxide, compound is precipitated?– **$CaCO_3$**	**Manipal-2019**
The property of the alkaline earth metals which increases with their atomic number?– **Solubility of their hydroxides in water**	**Manipal-2016 NEET-2010 Karnataka-CET-2021 Kerala-CEE-29.08.2021**
The elements of group-2 exhibits anomalous properties– **Be**	**MHT CET-2018**
The statements is false– **Ca^{2+} ions are not important in maintaining the regular beating of the heart**	**NEET-I 2016**

Search on TG: @apna_pdf
@apna_pdf

The metal ions play an important role in muscle contraction?– **Ca^{2+}**	**NEET-1994**
The sulphates of alkaline earth metals, the solubilities of $BeSO_4$ and $MgSO_4$ in water, respectively, are– **high and high**	**[JEE Main-2020, 6 Sep Shift-I]**
s-block element which cannot be qualitatively confirmed by the flame test is– **Be**	**JEE Main-26.06.2022, Shift-II**
The commercial salt to control hypothyroidism– **Sodium iodide**	**Kerala CEE -03.07.2022**
The correct order of hydration enthalpies of alkali is– **$Li^+ > Na^+ > K^+ > Rb^+$**	**AIIMS-2000**
The property of hydrogen points its more resemblance with halogen family members as compared to alkali metals?– **Reducing nature**	**SCRA-2012**
The alum used for purifying water is– **Potash alum**	
The sets of raw materials is used in the manufacture of Na_2CO_3 by Solvay process– **NaCl, NH_3, CO_2**	**AP EAMCET- 1999**
In the Castner's process of extraction of sodium cathode is– **Iron rod**	**AP EAMCET- 2000**
An element forms a solid oxide when is dissolved in water to forms an acidic solution. The elements is– **Phosphorus**	**MPPET- 2009**
Alkali metals are powerful reducing agents because_____– **Their ionization energies are low**	**AP EAPCET 23-08-2021 Shift-I**
Orange red coloured monoxide– **Cs_2O**	**AP EAMCET (Medical) - 2013**
The factor makes Li the strongest reducing agent in aqueous solution?– **Hydration enthalpy**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
The pair has bleaching property– **SO_2 and Cl_2**	**MPPET-2008**
The most electro + ve element in alkali metals is– **Cs**	**MPPET-2008**
The alkali metal with highest reactivity– **Cs**	**AP EAMCET (Engg.) 18.9.2020 Shift-I**
The products formed when chlorine reacts with cold and dilute sodium hydroxide solution.– **NaCl, NaOCl, H_2O**	**AP EAMCET (Engg.) 18.9.2020 Shift-I**
When borax is dissolved in water. It gives an alkaline solution. The alkaline solution consists the products– **NaOH & H_3BO_3**	**AP EAPCET 19-08-2021 Shift-I**
The elements forms highest number of compounds?– **Hydrogen**	**NDA (I)-2017**
In organic reactions, sodium in liquid ammonia is used as– **Reducing agent**	**AP EAMCET (Engg.) 2001**
Sodium dissolves in liquid NH_3 to give a deep blue solution. This is due to– **Ammoniated electrons**	**COMEDK-2014**
In Castner-Kellner cell for production of sodium hydroxide– **sodium amalgam is formed at mercury cathode**	**Karnataka NEET-2013**
The correct order of stability for the superoxides is– **$CsO_2 > RbO_2 > KO_2$**	**AP-EAMCET (Medical), 2008**
Sodium metal reacts with Al_2O_3 at high temperature to give a sodium compound X. X reacts with carbon dioxide in water to form Y. Y is– **Na_2CO_3**	**AP-EAMCET (Medical), 2002**
The products formed when Li_2CO_3 undergoes decomposition?– **$Li_2O + CO_2$**	**AP-EAMCET (Medical), 2002**
The correct order of electrical conductivity of alkali metals ions in their aqueous solution for Cs^+, K^+, Na^+ and Li^+ is– **$Cs^+ > K^+ > Na^+ > Li^+$**	**TS EAMCET 04.08.2021, Shift-I**
One of the by-products formed during the recovery of NH_3 from Solvay process is:– **$CaCl_2$**	**JEE Main 17.03.2021, Shift-II**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

A strong reducing agent is–	**Na**	**AIIMS-1994**
The metal reacts with water–	**sodium**	**AIIMS-1994**
The decarboxylating agent is–	**sodalime**	**COMEDK-2011**
On heating sodium metal in dry ammonia, the compound formed is–	**sodium amide**	**COMEDK-2019**
Sodium is not ordinarily observed in the +2 oxidation state because of its–	**High second ionization potential**	**COMEDK-2017**
Used for reviving the exhausted 'permutit' is–	**10% NaCl solution**	**AP-EAMCET (Medical), 2003**
The alkali metals have relatively low melting point. The alkali metals is expected to have highest melting point?–	**Li**	**NDA (II)-2015**
The chemical name of baking soda is–	**$NaHCO_3$**	**NDA (I)-2017**
The elements is least reactive with water–	**Lithium**	**NDA (I)-2017**
The alkali metals has lowest melting point–	**Caesium**	**NDA (I)-2018**
The metals is alloyed with sodium to transfer heat in a nuclear reactor?–	**Potassium**	**NDA (I)-2018**
The chemical formula of Washing Soda–	**$Na_2CO_3.10H_2O$**	**NDA (I)-2018**
In the following sequence of reaction, identify the compounds (A), (B) (C) and (D) : $Na_2CO_3 \xrightarrow[\text{Solution}]{SO_2} (A) \xrightarrow{Na_2CO_3} (B) \xrightarrow[\text{Heat}]{S} (C) \xrightarrow{AgNO_3} (D)$ –	**$NaHSO_3$, Na_2SO_3, $Na_2S_2O_3$, Ag_2S**	**(AIIMS-27 May, 2018-Evening)**
The commercially known as oxone is–	**Na_2O_2+HCl**	**(AIIMS-2014)**
Brine is an aqueous solution of–	**NaCl**	**NDA (I)-2018**
The order of solubility of lithium halides in non polar solvents follows the order:–	**LiI > LiBr > LiCl > LiF**	**(AIIMS-2012)**
The property of sodium is being used in street lights?–	**Sodium atom emits photons in the yellow region of visible spectrum, due to electrically stimulated transitions**	**(AIIMS-2011)**
The commercial salt is purified by passing–	**HCl gas through a saturated solution of salt**	**(AIIMS-2009)**
Na_2CO_3 reacts with SO_2 in alkaline medium to from:–	**$NaHSO_4$**	**(AIIMS-2010)**
Largest difference in radii is found in case of the pair–	**Na, K**	**(AIIMS-2007)**
On dissolving moderate amount of sodium metal in liquid NH_3 at low temperature,–	**Liquid ammonia remains diamagnetic**	**(AIIMS-2003)**
Sodium carbonate is soluble in water because of–	**Low lattice energy**	**(AIIMS-1997)**
Excess of NaOH reacts with Zn to form–	**Na_2ZnO_2**	**VITEEE- 2006**
The carbonates decomposes readily at low temperatures–	**Li_2CO_3**	**AP - EAMCET (Medical) - 2007**
Sodium reacts with water to give H_2 gas and the solution contains substance 'A'. Zinc metal reacts with solutions of 'A' to give the same H_2 gas. Compound 'A' is–		**SRMJEEE – 2013, 2012**

Important compounds of Na and Biological importance of Na and k

The metals is most reactive towards water–	**Cs**	**AMU-2005**
In Castner-Kellner cell for the manufacture of sodium hydroxide, the anode is made up of–	**graphite**	**AMU–2003**
The alkali metals is smallest in size–	**Li**	**AMU–2003**
The strongest reducing agent–	**Rb**	**AMU 2002**
The alkali metal which acts as a nutrient for plants is–	**K**	**AMU–2001**

Search on TG: @apna_pdf

@apna_pdf

The lightest gas– **Hydrogen**	**AMU–2001**
The alkali metal forms metal nitride by reacting with nitrogen of air– **Li**	**Assam CEE-2020 CG PET-2005**
Alkali metal hydrides follow the thermal stability order–**RbH < KH < NaH < LiH**	**Assam CEE-2018**
A white substance having alkaline nature in solution is:– **Na_2CO_3**	**BCECE-2006**
Most powerful reducing agent is:– **Li**	**BCECE-2005**
The insoluble in NaOH is – **$Fe(OH)_3$**	**BCECE-2004**
Glauber's salt is:– **$Na_2SO_4.10H_2O$**	**BCECE-2009, 2003**
A solution of Na in liquid NH_3 is– **blue**	**BCECE-2009**
The oxide gives H_2O_2 on treatment with dilute acid is– **Na_2O_2**	**BCECE-2009**
The alkali metals gives hydrated salts– **Li**	**BCECE-2012**
In the reaction, $M + O_2 \rightarrow MO_2$ (superoxide) the metal M is– **Potassium**	**BCECE-2018**
$LiAlH_4$ is used as:– **A reducing agent**	**BITSAT-2005**
Sodium peroxide in contact with moist air turns white due to formation of:– **NaOH**	**BITSAT-2010**
The alkali metals form salt-like hydrides by the direct synthesis at elevated temperature. The thermal stability of these hydrides decreases in orders?–**LiH > NaH > KH > RbH > CsH**	**BITSAT-2013 NEET-2008**
Two elements A and B have similar chemical properties. They don't form solid hydrogencarbonates, but react with nitrogen to form nitrides. A and B, respectively, are:– **Li and Mg**	**BITSAT-2021**
The elements belongs to s- block– **Potassium**	**CG PET -2008, 2005**
The colour of the flame of sodium is– **golden yellow**	**CG PET- 2012**
Pure nitrogen gas is obtained from– **$NH_4Cl+NaNO_2$**	**CG PET- 2012**
The reactivity of the alkali metal sodium with water, is made use of– **as a general drying agent**	**CG PET -2004**
Alkali metals in each period have– **lowest ionisation potential**	**CG PET -2004**
With the increase in atomic weights, melting points of the alkali metals– **decrease**	**CG PET -2004**
The electronic configuration of the most electropositive element– **$[Xe]6s^1$**	**CG PET -2005**
The alkali metals are low melting. The alkali metals is expected to melt if the room temperature rises to 30°C?– **Cs**	**HP CET-2018**
A metal on combustion in excess air forms X. X upon hydrolysis with water yields H_2O_2 and O_2 along with another product. The metal is– **Rb**	**[JEE Main-2019, 12 Jan Shift-I]**
A hydrated solid X on heating initially gives a monohydrated compound Y. Y upon heating above 373 K leads to an anhydrous white powder Z. X and Z, respectively, are– **washing soda and soda ash**	**[JEE Main-2019, 10 April Shift-II]**
The metal mainly used in devising photoelectric cells is– **Cs**	**[JEE Main-2020, 2 Sep Shift-I]**
On combustion of Li, Na and K in excess of air, the major oxides formed, respectively, are– **Li_2O, Na_2O_2 and KO_2**	**[JEE Main-2020, 4 Sep Shift-I]**
Reaction of an inorganic sulphite X with dilute H_2SO_4 generates compound Y. Reaction of Y with NaOH gives X. Further , the reaction of X with Y and water affords compound Z. Y and Z respectively, are– **SO_2 and $NaHSO_3$**	**[JEE Main-2020, 6 Sep Shift-II]**
The correct order of hydration enthalpies of alkali metal ions is– **$Li^+ > Na^+ > K^+ > Rb^+ > Cs^+$**	**[JEE Main-2019, 8 April Shift-I] AIIMS 25 May 2019 (Morning)**

JEAM SPY

Search on TG: @apna_pdf

@apna_pdf

Sodium metal on dissolution in liquid ammonia gives a deep blue solution due to the formation of– **Ammoniated electrons**	**[JEE Main-2019, 10 Jan Shift-II]**
NaH is an example of– **Saline hydride**	**[JEE Main-2019, 11 Jan Shift-I]**
Sodium salt of an organic acid 'X' produces effervescence with conc. H_2SO_4 'X' reacts with the acidified aqueous $CaCl_2$ solution to give a white precipitate which decolourises acidic solution of $KMnO_4$. 'X' is– **$Na_2C_2O_4$**	**[JEE Main-2017]**
The main oxides formed on combustion of Li, Na and K in excess of air respectively are– **Li_2O, Na_2O_2 and KO_2**	**[JEE Main-2016]**
The products obtained on heating $LiNO_3$ will be– **$Li_2O+NO_2+O_2$**	**[AIEEE-2011]**
The best description of the change that occurs Na_2O (s) is dissolved in water?– **Oxide ion donates a pair of electrons**	**[AIEEE-2011]**
KO_2 is used in space and submarines because it– **absorbs CO_2 and increases O_2 concentration**	**[AIEEE-2002]**
The correct order of conductivity of ions in water is– **$Cs^+ > Rb^+ > K^+ > Na^+$**	**[JEE Main-2021, 17 March Shift-I]**
Lithium shows diagonal relationship with– **Magnesium**	**J & K CET-(2014)**
The colour is imparted into the flame when lithium is burnt– **Crimson red**	**J & K CET-(2014)**
'The compound formed upon combustion of potassium metal in excess air is– **KO_2**	**J & K CET-(2015)**
Lowest melting point chloride is :– **LiCl**	**JCECE - 2006**
Alkali metals have high oxidation potential and hence, they behave as:– **Reducing agents**	**JCECE - 2005**
BaO_2 and ozone reacts to produce– **BaO**	**JCECE - 2007**
The alkali metals cesium is the most reactive because– **the outermost electron is more loosely bound than the outermost electron of the other alkali metals**	**JCECE - 2009**
Sodium reacts with water more vigorously than Li because it has– **more electropositive character**	**JCECE - 2011**
Sodium is treated with sufficient oxygen/air, the product obtained is– **Na_2O_2**	**JCECE - 2011**
Alcoholic KOH is used for– **dehydrohalogenation**	**JCECE - 2012**
The ion show maximum value of hydration energy is– **Li^+**	**JCECE - 2016**
Sodium sulphite is used in preserving squashes and other mildly acidic foods due to– **Sulphur dioxide and sulphurous acid formed kill bacteria and germs**	**JIPMER-2015**
The least thermally stable is– **Li_2CO_3**	**JIPMER-2014, 2009**
The metal that produces red-violet colour in the non-luminous flame is– **Rb**	**JIPMER-2011**
The most stable compound is– **LiF**	**JIPMER-2008**
The oxide of potassium that does not exist is– **K_2O_3**	**Karnataka-CET-2020**
An alkali metal hydride (NaH) reacts with diborane in A to give a tetrahedral compound B which is extensively used as reducing agent in organic synthesis. The compounds A and B respectively are– **$(C_2H_5)_2$ O and $NaBH_4$**	**Karnataka-CET-2015**

Search on TG: @apna_pdf

@apna_pdf

Alkali metals have negative reduction potential and hence they behave as– **reducing agents**	**Karnataka-CET-2013**
The oxide of an element electronic configuration is $1s^2, 2s^2, 2p^6, 3s^1$ is– **Basic**	**KARNATAKA-CET, 2009**
The characteristic not related to alkaly metal is– **high ionisation energy**	**KARNATAKA-CET, 2009**
The low solubility of LiF and that of CsI in water are respectively due to the properties of the alkali metal ions– **Higher lattice enthalpy of Li^+, smaller hydration enthalpy of Cs^+**	**Kerala-CEE-2016**
Li occupies higher position in the electrochemical series of metals as compared to Cu since– **The standard reduction potential of Li^+/Li is lower than that of Cu^{2+}/Cu**	**WB-JEE-2012**
An organometallic compound– **Methyl lithium**	**Manipal-2020**
In the reaction NaOH + S → A + Na_2S + H_2O; A is :– **$Na_2S_2O_3$**	**Manipal-2019**
All the s-block elements of the periodic table are placed in the groups .....– **IA and IIA**	**Manipal-2019**
The element has maximum photoelectric effect– **Cs**	**Manipal-2016**
The elements does not form amide when reacted with ammonia– **Li**	**MHT CET-02.05.2019, SHIFT-II**
Solubility of substances in water increases slightly with rise in temperature?– **Potassium chloride**	**MHT CET-2014**
Ionic mobility of alkali metal ions is lowest when aqueous solution of their salts are put under an electric field?– **Li**	**NEET-2017**
The alkali metals, forms only, the normal oxide, M_2O on heating in air– **Li**	**NEET-2012**
The ease of adsorption of the hydrated alkali metal ions on an ion-exchange resin in the order– **$Rb^+ < K^+ < Na^+ < Li^+$**	**NEET-2012**
The sequence of ionic mobility in aqueous solution is– **$Cs^+ > Rb^+ > K^+ > Na^+$**	**NEET-2008**
The properties of alkali metals increases in magnitude as the atomic number rises– **Ionic radius**	**NEET-1989**
In the case of alkali metals, the covalent character decreases in the order– **MI > MBr > MCl > MF**	**NEET-2009**
The compound will show the highest lattice energy– **NaF**	**NEET-1993**
The alkali metal chloride (MCl) forms its dihydrate salt ($MCl.2H_2O$) easily?– **LiCl**	**NEET-Odisha 2019**
The highly reactive alkali metals are kept in– **Kerosene**	**UP CPMT-2010**
The formula of Calgon, used for water softening is– **Na_2 $[Na_4(PO_3)_6]$**	**UP CPMT-2008**
The formula of potash alum is:– **$K_2SO_4 . Al_2(SO_4)_3 . 24H_2O$**	**UPTU/UPSEE-2004**
The most basic in character is– **CsOH**	**UPTU/UPSEE-2004**
The element on burning in air gives peroxide is– **sodium**	**UPTU/UPSEE-2008**
The substances react with water. The pair that gives the same gaseous product is– **sCa and CaH_2**	**NEET-1994**
The processes, fused sodium hydroxide is electrolysed at a 330 ^{0}C temperature for extraction of sodium?– **Castner's process**	**NEET-2000**
The fusion mixture is – **Mixture of K_2CO_3 + Na_2CO_3**	**NEET-1994**

TEAMSDY

Search on TG: @apna_pdf

@apna_pdf

15. p- Block Elements

Group -13 to group 18 element

- α and β forms of sulphur are at equilibrium at a temperature known as– **Transition temperature**
- Ozone is– **An allotrope of oxygen**
- Hybridisation of S in SF_6 is– **sp^3d^2**
- The number of σ and π bonds present in a molecule of H_2SO_4 are respectively– **6, 2**
- Conc H_2SO_4 displaces hydrogen chloride from chlorides because– **Chlorides are the salt of acid HC*l* which is more volatile than H_2SO_4**
- The type of bonds present in sulphuric anhydride is– **3σ, 1 pπ – pπ and 2pπ - dπ**
- Dissolution of sulphuric acid in water is– **An exothermic process**
- The name of the compound $H_2S_2O_8$– **Peroxodisulphuric acid**
- Ozonisation of water is carried to remove– **Bacterial impurities**
- Catalyst used in making H_2SO_4 in Contact process is– **V_2O_5**
- BaO_2 and Ozone reacts to produce– **BaO**
- Sulphur molecule is– **Octa-atomic**
- Metal reacts with sulphur to give– **Sulphide**
- Caro's acid is– **H_2SO_5**
- The number of unpaired electrons in the p-subshell of oxygen atom is– **2**
- Strongest reducing agent of the following is– **H_2Te**
- The maximum covalency of oxygen is 4 due to– **Absence of d orbitals**
- O_2^{2-} is the symbol of ..... ion– **Peroxide**
- When H_2SO_4 is added to CaF_2 is – **$CaSO_4$, HF**
- A and B in the given reaction respectively are $2KClO_3 \xrightarrow[MnO_2]{Heat} A + B$– **KC*l* and O_2**
- The one with lowest negative electron affinity in group 16 is– **Oxygen**
- The hybridisation and shape of SF_4 is respectively– **sp^3d, see-saw**
- Dioxygen can be prepared by– **Heating $KClO_3$, Thermal decomposition of oxides like Ag_2O, Pb_3O_4 etc and Electrolysis of water**
- Form of sulphur which shows paramagnetic behaviour– **S_2 in vapour state**
- ..... has bleaching action due to reduction and it is temporary– **SO_2**
- S–S bond is present in– **$H_2S_2O_6$**
- ..... is most acidic oxide– **Cl_2O_7**
- When Cu is reacted with hot concentrated solution of H_2SO_4 then the gas obtained is– **SO_2**
- A metal X when burnt in air, X-forms oxide and nitride both, X can be– **Mg**
- Acidity of diprotic acids in aqueous solutions increases in the order– **$H_2S < H_2Se < H_2Te$**
- Pb + conc. HNO_3 gives– **$Pb(NO_3)_2 + NO_2$**
- The molecular geometry of the interhalogen AB_5 is– **Square pyramidal**
- Iodine has lowest oxidation state in– **KI_3**
- Cl_2O is an anhydride of– **Hypochlorous acid**
- Cl_2O_6 is an anhydride of– **Chloric acid, Perchloric acid**
- Among the known interhalogens, the maximum number of halogen atoms in a molecule is/are– **8**
- In oxoacids of chlorine, $Cl=O$ bond is formed by the overlapping which is– **dπ - pπ**
- The ion that cannot undergo disproportionation is– **ClO_4^-**
- The halogen gives two gases, on treatment with water is– **F_2**
- Least volatile hydrogen halide is– **HF**
- The bond dissociation enthalpy of F_2 is– **Smaller than the bond dissociation enthalpy of Cl_2**
- Bleaching action of $CaOCl_2$ is due to– **Nascent oxygen**
- The halogen which is solid at room temperature is– **I_2**
- Iodine is more soluble in aqueous solution of KI because it forms soluble– **KI_3**
- The halogen can form both cations and anions also– **I**
- Fluorine exhibits– **–1 oxidation state only**
- The bond dissociation energy of F_2 is very low due to– **Repulsions between non bonding electrons**
- The property that correspond to the order HI > HBr > HCl < HF is– **Reducing power**

Search on TG: @apna_pdf

@apna_pdf

- The set with order of acidity is– **$HClO < HClO_2 < HClO_3 < HClO_4$**
- The number of lone pairs on chlorine atom in ClO^-, ClO_2^-, ClO_3^-, ClO_4^- ions are– **3, 2, 1, 0**
- Cl_2 on reaction with excess of NH_3 gives– **NH_4Cl + N_2**
- Cl_2 on reaction with cold and dilute NaOH gives NaCl and– **NaOCl**
- ..... is most basic– **F^-**
- The final product formed, when alkaline KI solution reacts with ozone, is– **I_2**
- The shape of ClF_2^-, is– **Linear**
- Reaction of Cl_2 with hot and conc. NaOH produces– **$NaClO_3$**
- AlF_3 is soluble HF only in presence of KF. It is due to the formation of– **$K_3[AlF_6]$**
- ..... is least likely to act as a Lewis base– **BF_3**
- ..... is the strongest acid– **$HClO_4$**
- When Cl_2 gas reacts with hot and concentrated sodium hydroxide solution, the oxidation number of chlorine changes from– **Zero to –1 and zero to +5**
- ..... is least likely to behave as Lewis basic– **BF_3**
- ..... is the strongest oxidising agent– **F_2**
- ..... displaces Br_2 from an aqeous solution containing bromide ions– **Cl_2**
- Least volatile hydrogen halide is– **HF**
- ..... has ability to release bromine from KBr– **F_2**
- ..... is used during the preparation of fluorine by the law Gray method – **Molten KHF_2**
- In Xenon tetrafluoride, the hybridised state of Xe is– **sp^3d^2**
- The noble gas compound prepared by bartlett was– **$XePtF_6$**
- In XeF_2, XeF_4 and XeF_6 the number of lone pair on Xe is/ are respectively– **3, 2, 1**
- 'A' in the given reaction is $XeF_4 + O_2F_2 \rightarrow A + O_2$ **XeF_6**
- Cationic part of solid XeF_6 having the shape is– **Square pyramidal**
- Number of unpaired electrons in inert gas is– **Zero**
- Noble gases form compounds very easily with– **Fluorine**
- The lightest gas is non-inflammable is– **He**
- XeF_2 molecule is– **Linear**
- XeF_6 on complete hydrolysis gives.– **XeO_3**
- The number of lone pairs of electrons on xenon atom in $XeOF_4$ molecule is– **1**
- Thermal and electrical conductivity is highest in– **Bi**
- Maximum covalency of Sb will be– **5**
- Sodium nitrate decomposes above 800°C to give– **N_2, O_2, Na_2O**
- The nitrogen oxide(s) that contain (N – N) bonds is (are)– **N_2O, N_2O_3 and N_2O_4**
- Aqua regia mixture is a – **3 : 1 ratio of conc HCl and conc HNO_3**
- During bleaching action, SO_2 converts into– **H_2SO_4**
- IBr_7 cannot exist but IF_7 exist. This fact can be explained on the basis of– **Ratio of radii of atoms**
- Iodine reacts with concentrated HNO_3 to yeild Y along with other products. The oxidation state of iodine in Y, is – **5**
- $FeSO_4$ forms brown ring with– **NO**
- Both allotropic forms of sulphur i.e., α- and β-sulphur are stable at temperature 369 K, this temperature is called as– **Transition temperature**
- The oxidation state of nitrogen is a fractional value in– **Hydrazoic acid**
- Aqua regia is used for dissolving noble metals (Au, Pt, etc). The gas evolved in this process is– **NO**
- Ozone is obtained from oxygen– **By silent electric discharge**
- Chemically, inert halide of sulphur is– **SF_6**
- Commercial name of peroxymonosulphuric acid is– **Caro's acid**
- Ozone is a– **Powerful oxidizing agent**
- In the preparation of sulphuric acid, V_2O_5 is used in the reaction, which is– **$2SO_2 + O_2 \rightarrow 2SO_3$**
- Anomalous behaviour of Nitrogen is due to– **Small size and high electronegativity**
  Non availability of d-orbitals in valency shell
  Ease of multiple bond formation
- Conc. H_2SO_4 is diluted– **By adding H_2SO_4 in water**
- Ozone oxidises lead sulphide to– **Lead sulphate**
- When chlorine is passed over dry slaked lime at room temperature, the main reaction product is– **$Ca(OCl)_2$**
- Perchloric acid is prepared by the action of concentrated sulphuric acid on– **$NaClO_4$**
- Shape of $XeOF_4$ is– **Square pyramidal**
- In cold water, bleaching powder ionises to form– **Ca^{2+}, Cl^- and ClO^-**
- In hot water, Bleaching powder does not give– **ClO^- ions**
- A fresh stain of iodine can be removed by using a solution of– **$Na_2S_2O_3$**
- In a cyclotrimetaphosphoric acid molecule, how many single and double bonds are present– **3 double bonds; 12 single bonds**
- On heating lead nitrate, it forms oxides of nitrogen and lead. The oxides formed are– **NO_2, PbO**
- Maximum covalency of nitrogen is– **4**
- On heating ammonium dichromate and barium azide separately we get– **N_2 in both cases**
- The oxidation state of central atom in the anion of compound NaH_2PO_2 will be– **+1**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

- In solid state, PCl_5 is a– **Ionic solid with $[PCl_4]^+$ tetrahedral and $[PCl_6]^-$ octahderal**
- Strong reducing behaviour of H_3PO_2 is due to– **Presence of one –OH group and two P–H bond**
- Basicity of phosphinic acid is– **1**
- The reaction of concentrated sulphuric acid with carbohydrates ($C_{12}H_{22}O_{11}$) is an example of **Dehydration**
- The order of N–compounds in its decreasing order of oxidation states is– **HNO_3, NO, N_2, NH_4Cl**
- In the structure of ClF_3, the numbr of lone pair of electrons on central atom 'Cl' is– **Two**

  XeF_6 on complete hydrolysis gives– **XeO_3**
- In xenon fluoride most reactive in XeF_6, XeF_4 and XeF_2 is– **XeF_6**
- XeF_2 is isostructural with– **ICF_2^-**
- The symbol of element with atomic number 113, is– **Nh**
- The reason behind the lower atomic radius of Ga as compared to Al is– **Poor screening effect of d-electrons for the outer electrons from increased nuclear charge**
- First ionisation enthalpy of Al is lower than that of Mg. This is because– **It is easier to remove electron from unpaired $3p^1$ than from paired $3s^2$**
- In group 13, electronegativity first decreases from B to Al and then increases marginally down the group. This is because of– **Discrepancies in atomic size of elements**
- Group 13 elements show– **+1 and +3 oxidation states**
- Aluminium exhibits +3 oxidation state. As we move down the group, +1 oxidation state gets more stable. This is a consequence of– **Inert pair effect**
- Group 13 elements show +1 and +3 oxidation states. Relative stability of +3 oxidation state may be given as– **$B^{3+} > Al^{3+} > Ga^{3+} > In^{3+} > Tl^{3+}$**
- Electropositive character for the elements of group 13 follows the order– **B < Al > Ga > In > Tl**
- The shapes and hybridisation of BF_3 and BH_4^- respectively are– **BF_3 - Trigonal, sp^2 hybridisation; BH_4^- Tetrahedral, sp^3 hybridisation**
- The decreasing order of power of boron halides to act as Lewis acids is– **$BBr_3 > BCl_3 > BF_3$**
- $AlCl_3$ achieves stability by forming a dimer. In trivalent state the compound is hydrolysed in water. $AlCl_3$ in acidified aqueous solution forms– **$[Al(H_2O)_6]^{3+} + 3Cl^-$**
- If we heat an aqueous solution of $AlCl_3$ to dryness, expected formation is of – **Dimer Al_2Cl_6**
- Anhydrous $AlCl_3$ is prepared by reaction of– **dry HCl gas and heated Al metal**
- Anhydrous $AlCl_3$ fumes in air. The reason for it is– **It is hydrolysed in moist air giving out fumes of HCl**
- The first member of the p-block element differs from the remaining members of their corresponding groups due to– **Small size and absence of d-orbitals**
- Boron is unable to form BF_6^{3-} ions due to – **Non-availability of d-orbitals**
- BF_3 is used as a catalyst in various organic reactions because– **It is a strong Lewis acid**
- Chemically borax is known as– **Sodium tetraborate decahydrate**
- $Na_2B_4O_7 + X \rightarrow H_3BO_3$. X in the reaction is– **Conc. H_2SO_4 or HCl**
- When a mixture of cobalt oxide and borax is heated in a flame on a loop of platinum wire forms– **A blue coloured $Co(BO_2)_2$ bead**
- Borax-bead test is responded by Metals which form - **Coloured metaborates**
- Boric acid has a polymeric layer structure in which planar BO_3 units are joined by– **Hydrogen bonds**
- Boric acid is the trival name for– **Orthoboric acid**
- An aqueous solution of boric acid is found to be weakly acidic in nature because– **It is a Lewis acid which abstracts OH^- from water and leaves H^+ to make the solution acidic**
- On hydrolysis, diborane produces– **$H_3BO_3 + H_2$**
- When diborane reacts with Lewis bases, then it undergoes cleavage to give – **borane adduct BH_3.L (where, L = Lewis base)**
- The type of hybridisation of boron in diborane is– **sp^3-hybridisation**
- In diborane– **Two bridged hydrogen atoms and two terminal hydrogen atoms are present**
- The hardest compound of boron is– **B_4C**
- Substance used as protective shields in nuclear industries is– **^{10}B**
- The tendency of group 14 elements to show +2 oxidation state increases in the order of– **C < Si < Ge < Sn < Pb**
- The inert pair effect is most prominent in– **Pb**
- The most stable ion is– **Pb^{2+}**
- All members of group 14 when heated in oxygen form oxides. The trend of oxides is– **CO_2 and SiO_2 are acidic**
- Group-14 elements that is a radioactive element is– **Flerovium**

Search on TG: @apna_pdf

@apna_pdf

- An element of group 14 forms two oxides one of which is highly poisonous and neutral. Other oxide can be easily liquefied and compressed to give a solid which is used as a refrigerant under the name of drikold. The element and the oxides are– **C, CO, CO_2**
- There is a large number of carbon compounds due to the property of– **Strong catenation**
- Carbon shows a maximum covalency of four whereas other members can expand their covalence. It is because of– **Absence of d-orbitals in carbon**
- Maximum ability of catenation is shown by– **C**
- State the hybridisation of C atom in graphite– **sp^2**
- In graphite, the layers of carbon atoms are held by– **Van der Waals forces**
- The most stable form of carbon at high temperature is X. The C – C bond length in diamond is Y while C – C bond length in graphite is Z. X, Y and Z respectively are– **Diamond, 1.54 Å, 1.42Å**
- Carbon monoxide acts as a donor and reacts with certain metals to give metal carbonyls. This is due to– **Presence of a lone pair on carbon atom in CO molecule**
- The oxide which can act as a reducing agent– **CO**
- When excess of carbon dioxide is passed through lime water, the milkiness first formed disappears due to formation of – **Water soluble calcium bicarbonate**
- CO_2 makes it of biological and geochemical importance, due to its the property of– **low solubility in water**
- Silicon is an important constituent of– **Sand**
- The acid that cannot be stored in glass– **HF**
- When silicon is heated with methyl chloride in presence of copper as a catalyst at 573 K, it forms– **Methyl substituted chlorosilanes**
- In SiO_4^{4-}, the tetrahedral molecule, two oxygen atoms are shared in– **Chain silicates**
- Glass and cement are two important examples of– **Man-made silicates**
- A type of zeolite used to convert alcohols directly into gasoline is– **ZSM-5**
- The least stable compound is **$TlCl_3$**
- A pairs has almost same radii – **Al, Ga**
- The tendency of BF_3, BCl_3 and BBr_3 to behave as lewis acid decreases in the sequence– **$BBr_3 > BCl_3 > BF_3$**
- Bauxite has the composition– **$Al_2O_3.\ 2H_2O$**
- The stability of +1 oxidation state increase in the sequence– **Al < Ga < In < Tl**
- The ion (s) that act as an oxidizing agent in solution is/are– **Tl^{3+} only**
- Conc. HNO_3 is stored in container made up of– **Al**
- The maximum covalent character is shown by the compound– **$AlCl_3$**
- The compound(s) undergoes disproportionation in aqueous solution– **InCl**
- BF_3 is– **electron deficient compound**
- The element of Group 13 is the strongest reducing agent– **Al**
- Does not exhibit inert pair effect– **B**
- The outer electronic configuration of group-13 element is– **ns^2np^1**
- The maximum oxidation state shown by a p-block element is equal to the– **Sum of the s-and p-electrons**
- The electronegativity of group-13 elements– **First decreases from B to Al and then increases marginally**
- The element that exhibits negative oxidation state in IIIA group element is– **B**
- Aluminium chloride in acidified aqueous solution forms– **B_2O_3 and Al_2O_3**
- Aluminium and gallium oxides are– **Amphoteric**
- The maximum covalence of B is 4 due to– **The absence of d orbitals**
- On moving down the group 13 density– **Increases**
- High melting point of boron is due to its existence as– **Giant covalent solid**
- Elements of group 13 mainly form covalent compounds because– **Size of ions is small, Sum of three ionization energies is very high, Electronegativity values are high**
- Oxidation state shown by group 13 elements is– **+1 and +3**
- The ..... elements of group 13 can react with alkali solution to give H_2 gas– **Boron, Aluminium and Gallium**
- Lewis acid character of boron trihalides is– **$BI_3 > BBr_3 > BCl_3 > BF_3$**
- Aluminium is used for making alloys because of its– **Resistance to corrosion**
- Most abundant metal by mass in earth crust is– **Aluminium**
- Boron compounds behave as Lewis acids because of their– **Electron deficient nature**
- ..... similar structure is to graphite– **Boron Nitride (BN)**
- ..... is least likely to behave as Lewis base– **BF_3**
- ..... molecules acts as a Lewis acid– **$(CH_3)_2B$**
- Chemical formula of bauxite is– **$Al_2O_32H_2O$**
- In borax bead test ..... compound is formed– **Metaborate**
- Dimer Al_2Cl_6 is formed because– **Aluminium forms coordinate bonds with chlorine to complete its octet**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

- When we heat borax strongly then it will yield the ..... compound– **$NaBO_2$ and B_2O_3**
- $B(OH)_3$ accept how many OH^- ions– **1**
- Boric acid is having a polymeric type structure because of its– **Hydrogen bonds**
- In diborane each boron forms– **Four bonds**
- The number of sigma and pi bonds present in inorganic benzene are respectively– **3σ, 12π**
- On strong heating, boric acid yields– **B_2O_3**
- Number of hydroxyl group attached to Boron in Borax are– **Four**
- ..... is least likely to act as a Lewis base– **BF_3**
- ..... is electron-deficient– **$(BH_3)_2$**
- ..... molecular hydrides acts as a Lewis acid– **B_2H_6**
- ..... hydrogen are irreplaceable in diborane– **2**
- Borax is– **$Na_2[B_4O_5(OH)_5]\cdot 8H_2O$**
- Al_2O_3 can be converted to anhydrous $AlCl_3$ by heating– **A mixture of Al_2O_3 and carbon in dry Cl_2 gas**
- Producer gas is– **$CO + N_2$**
- Aluminium (III) chloride forms a dimer because aluminium– **Can have higher coordination number**

Important Compounds of Boron & Uses of Boron and Aluminium and their Compounde

- The electron deficient molecule is. **B_2H_6**
- Inorganic benzene is– **$B_3H_6N_3$**
- The number of isomers possible for disubstituted borazine, $B_3N_3H_4X_2$, is– **4**
- The type of hybridization of boron in diborane is– **sp^3 - hybridization**
- A bond that does not exist in diborane is– **B – B**
- The maximum number of atoms present in the same plane in diborane molecule is– **6**
- When borax is heated in a Bunsen burner flame with CoO on a loop of platinum wire– **A blue coloured $Co(BO_2)_2$ bead is formed**
- When orthoboric acid is heated above 370 formed **Metaboric acid**
- HBO_2 (obtained on heating orthoboric acid above 370 K) on further heating yields– **Boric oxide**
- Diborane is produced on an industrial scale by– **The reaction of BF_3 with sodium hydride**
- Used in making bullet-proof vest– **Boron fibre**
- Borax and boric acid are used in the manufacture of– **Glass-wool, Heat resistant glasses and Fibreglass**
- Used as a flux for soldering metals– **Borax**
- An aqueous solution of generally used as a mild antiseptic– **Orthoboric acid**
- The element is used in making transistor– **Si**
- The stability of dihalides of Si, Ge, Sn and Pb increases steadily in the sequence– **$SiX_2 << GeX_2 << SnX_2 << PbX_2$**
- The oxides is not expected to react with sodium hydroxide– **CaO**
- The oxidation states are the most characteristic for lead and tin respectively– **+2, +4**
- The group 14 has the highest melting and boiling point– **C**
- The reducing character (M^{2+} species) in dihalides decreases as– **$GeCl_2 > SnCl_2 > PbCl_2$**
- The oxides is acidic– **SiO_3**
- The strongest reductant among the following is– **$GeCl_2$**
- The outer shell electronic configuration of group 14 elements is– **ns^2np^2**
- The common oxidation state exhibited by group 14 elements– **+4 and +2**
- Lead compounds in +4 oxidation state are– **Strong oxidising agents**
- The about monoxides of group 14 elements– **GeO is acidic, CO is neutral, SnO and PbO are amphoteric and Melting point**
- Group 14 elements have general electronic configuration– **ns^2np^2**
- Tendency of carbon for catenation is because carbon-carbon atom bond energy is– **High**
- All elements except carbon have tendency to show maximum co-valency of six– **Due to presence of vacant d-orbitals**
- In diamond, carbon have– **sp^3 hybridization**
- Graphite has– **2-D sheet structure, Vander Waals forces between different layers, sp^2 hybridized carbon atoms in hexagonal planar structure**
- In graphite, the bond is– **Covalent**
- C–O bond length is maximum in– **CO_3^{2-}**
- Dry ice is composed of– **Solid CO_2**
- The metallic character of group 14– **Increases from top to bottom**
- In carbon family the tendency to show +2 oxidation state increases in order of– **Ge < Sn < Pb**
- The mixture of CO & H_2 is known as– **Water gas or synthesis gas**
- pπ-pπ multiple bond is seen in– **Mostly carbon**
- The geometry of $SiCl_4$ is– **Tetrahedral**
- It is because of inability of ns^2 electrons of the valence shell to participate in bonding that– **Sn^{2+} is reducing while Pb^{4+} is oxidising**
- Name the type of the structure of silicate ..... oxygen atom of $[SiO_4]^{4-}$ is shared– **Pyrosilicate**
- The ..... oxide is amphoteric– **SnO_2**
- The ..... oxidation states are the most characteristic for lead and tin respectively– **+2, +4**

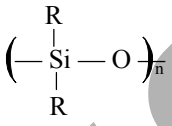
Search on TG: @apna_pdf

@apna_pdf

- In graphite, electrons are– **Delocalised within the layer**
- Oxalic acid on heating with conc. H_2SO_4 gives– **$CO + CO_2 + H_2O$**
- Chemical formula of phosgene is– **$COCl_2$**

Allotropes of Carbon

- In silicones, silicon is strongly linked to– **Oxygen**
- Silicones are used as– **Sealant, Electrical insulators Greases and**
- The property is common in diamond and graphite– **Atomic weight**
- Silica is soluble in– **HF**
- Silica reacts with hydride of superhalogen to form 'X' is formed. 'Y' on heating at 1000°C loses water to form 'Z'. The 'Z' can also be prepared in the following reaction.– **$Si + O_2 \rightarrow SiO_2$**
- The repeating structural unit of silicone is–



- These is not a monomer for a high molecular mass silicone polymer?– **Me_3SiCl**
- The ratio of "Si" and "O" atoms in silica is– **1 : 2**
- Silica dissolves in NaOH solution to form:– **Sodium silicate**
- Thermodynamically most stable allotrope of carbon is– **Graphite**
- The ..... elements is a metalloid– **Germanium**
- On moving down the group, acidic nature of oxides of group 14– **Decreases**
- The ..... elements forms double or triple bond involving pπ-pπ bonding– **Carbon**
- Allotropy is due to– **Difference in the arrangement of atoms in the molecules in the crystal**
- Select Orhoboric acid (H_2BO_3) and metaboric acid (HBO_3) differ in respect of– **Basicity, Structure**
- The geometry carbon atoms in diamond are bonded to each other is– **Tetrahedral**
- The hybridization state of carbon in fullerene is– **sp^2**
- Graphite has– **hexagonal sheet like structures**

Some Important Compounds of Carbon & Silicon

- Producer gas is a mixture of– **$CO + N_2$**
- ZSM-5 is used to convert– **Alcohols directly into gasoline**
- The compounds, does the vacant orbital can participate in hybridisation is– **B_2H_6, Al_2Cl_6**
- Nitrogen cannot be obtained by heating– **$Pb(NO_3)_2$**
- The bond dissociation energy of M–M bond decreases in the order– **C – C > Si – Si > Ge – Ge > Sn – Sn**
- $Na_2B_4O_7.10H_2O \xrightarrow{\Delta} X + NaBO_2 + H_2O$
  $X + Cr_2O_3 \xrightarrow{\Delta} Y$ (green colored)
  The X & Y are– **B_2O_3 & $Cr(BO_2)_3$**
- A π bond between species is not successful– **Si & O (in SiO_2)**
- The first ionisation energies of the element of group 14 follow the order.– **C > Si > Ge > Pb > Sn**
- Aqueous solution of borax is _____ in nature– **Alkaline**
- Borax is the sodium salt of– **Tetra oric acid**
- Thallous chloride is more stable than thalic chloride because of– **Inert pair effect**
- The metal that does not give the borax bead test– **Lead**
- The formula of borax– **$Na_2[B_4O_5(OH)_4].8H_2O$**
- Orthoboric acid contains– **Triangular B O_3^{3-} units**
- H_3BO_3 is– **Monobasic acid and weak lewis acid**
- Not an ionic trihalide is **BF_3**
- Two elements X and Y react separately with highly electropositive metal to form binary compounds, upon hydrolysis yield mixture of boranes and silanes. X and Y respectively are– **B, Si**
- Aluminate ion in aqueous solution actually exists as– **$[Al(OH)_4(H_2O)_2]$**
- The inactiveness of aluminium in the presence of cone. HNO_3 is due to the formation of a layer of– **Al_2O_3**
- Al and Ga have the same covalent radius because of– **Greater shielding of s-electrons of Ga atoms**
- The species does not exist– **$[BF_6]^{3-}$**
- A metal 'X' produces an oxide and nitride on buring in air, but do not liberate hydrogen with alkali. Another metal 'Y' produces an oxide and nitride on buring in air, bul liberate hydrogen with alkalies. Then 'X' and 'Y' are– **Mg, Al**
- Boron halides are– **Electron deficient compounds**
- Beryllium and aluminium exhibit many properties are similar. But, the two elements differ in– **Exhibiting maximum covalency in compounds**
- When a nitrate is boiled with aluminium turnings and con. NaOH solution, the gas liberated is– **NH_3**
- For the properties mentioned, the correct trend for the different species is in–Strength as Lewis acids **– $BCl_3 > AlCl_3 > GaCl_2$**
- In diborane, the number of electrons that account for bonding in the bridges is– **Four**
- The hybridization of the central atom will change when– **H_3BO_3 combines with OH^+ in solid phase**

TEAM SPY

Search on TG: @apna_pdf
@apna_pdf

- Graphite is a good conductor of electicity due to– **Presence of free and mobile electrons**
- Boron cannot form one of the following anions– **BF_6^{3-}**
- In the preparation of amorphous silicon, HF acid is used to remove– **SiO_2**
- Compound that combines with haemoglobin of blood to form carboxyhaemoglobin is– **CO**
- Used in making fire proof clothes is **$Al_2(SO_4)_3$**
- A chief component of silvery paints is **Al**
- Organosilicon polymers containing type of linkages– **Si–O–Si**
- The basic structure unit of silicates is– **SiO_4^{4-}**
- A gas other than HCl is obtained in–

$$BCl_3 + H_2 \xrightarrow[\text{Discharge}]{\text{Silent electric}}, LiAlH_4 + BF_3 \rightarrow$$

- Name the type of the structure of silicate in which one oxygen atom of $[SiO_4]^{4-}$ is shared– **Pyrosilicate**
- Among the the substituted silanes, the one will give rise to cross linked silicone polymer on hydrolysis– **R $SiCl_3$**
- The anions is present in the chain structure of silicates– **$(SiO_3^{2-})_n$**
- The group elements represent p-block elements– **Group 13 to group 18**
- The non-metals and metalloids exist in– **Only p-block elements**
- The hybridisation state of Al in the complex ion, $[Al(H_2O)_6]^{3+}$ is– **sp^3d^2**
- Borohydrides, are prepared by the reaction of– **Metal hydrides with B_2H_6 in diethyl ether**
- The element exists in liquid state for a wide range of temperature and can be used for measuring high temperature is– **Ga**
- A Lewis acid is **$AlCl_3$**
- The geometry of a complex species can be understood from the knowledge of type of hybridisation of orbitals of central atom. The hybridisation of orbitals of central atom in $[B(OH_4)]^-$ and the geometry of the complex are respectively– **sp^3, tetrahedral**
- The oxides is acidic in nature– **B_2O_3**
- The exhibition of highest coordination number depends on the availability of vacant orbitals in the central atom. The elements is not likely to act as central atom in MF_6^{3-} – **B**
- Boric acid is an acid because its molecule– **Accepts OH^- from water releasing proton**
- Catenation i.e., linking of similar atoms depends on size and electronic configuration of atoms. The tendency of catenation in group 14 elements follows the order– **C >> Si > Ge ≈Sn**
- Silicon has a strong tendency to form polymers like silicones. The chain length of silicone polymer can be controlled by adding– **Me_3SiCl**
- Ionisation enthalpy (Δ_iH kJ mol^{-1}) for the elements of group 13 follows the order– **B > Al < Ga > In < Tl**
- A compound X, of boron reacts with NH_3 on heating to give another compound Y which is called inorganic benzene. The compound X can be prepared by treating BF_3 with lithium aluminium hydride. The compounds X and Y are represented by the formulas– **B_2H_6, $B_3N_3H_6$**
- Quartz is extensively used as a piezoelectric material, it contains– **Si**
- The most commonly used reducing agent is– **$SnCl_2$**
- Dry ice is– **Solid CO_2**
- Cement, the important building material is a mixture of oxides of several elements. Besides calcium, iron and sulphur, oxides of elements of which of the group (s) are present in the mixture– **Group 2**
- The oxide is amphoteric in nature– **[2020 Covid] SnO_2**
- The species is not stable – **[2019] $[SiCl_6]^{2-}$**
- The elements is unable to form MF_6^{3-} ion– **[2018]**

Group-15 (Nitrogen Family)

- The decreasing order of the boiling points of the following hydrides is– **$H_2O > SbH_3 > NH_3 > AsH_3 > PH_3$**
- One mole of calcium phosphide on reaction with excess of water gives– **Two mole of phosphine**
- In the reaction of NaOH with P, PH_3 and NaH_2 PO_2 are obtained. The reaction is an example of– **Disproportionation**
- The number of steps in which orthophosphoric acid ionizes is/are– **3**
- The acid which forms two series of salt is– **H_3PO_3**
- The oxidation state(s) of nitrogen in ammonium nitrate is/are– **3, + 5**
- The number of bond pairs and lone pairs of electrons, on nitrogen atom in nitrate ions, are respectively– **4, 0**
- The two stable isotopes of nitrogen atom are– **^{14}N and ^{15}N**
- Nitrogen can form only one chloride with chlorine is NCl_3 whereas P can form PCl_3 and PCl_5. this is– **Due to absence of vacant d-orbitals in nitrogen**
- The oxide of nitrogen is obtained on heating ammonium nitrate at 250°C– **Nitrous oxide, N_2O**
- The structure of white phosphorus is– **Tetrahedral**
- PCl_3 on hydrolysis gives– **H_3PO_3**

Search on TG: @apna_pdf

@apna_pdf

- Nitrous oxide is– **Neutral**
- A brown ring is formed in the ring test for NO_3^- ion. it is due to formation of– **$[Fe(H_2O)_5(NO)]^{2+}$**
- The element of 15th group which cannot exhibit allotropy– **Bi**
- Nitrogen shows allotropy in _____ state– **Solid**
- Dinitrogen is inert at room temperature because– **It has high bond enthalpy of N ≡ N bond**
- The trend in the hydrides from Bi to N is– **Bond length decreases**
- The largest bond angle is in– **NH_3**
- Oxide of nitrogen formed in the atmosphere during the lightenings is– **NO**
- The bond pairs and lone pair of electrons respectively are present in ammonia molecule– **3 and 1**
- Ammonia molecule acts as a– **Lewis base**
- Maximum covalent character is shown by– **NCl_3**
- HNO_2 on disproportionation gives HNO_3 and– **NO**
- Oxide of nitrogen is acidic in nature and blue coloured liquid at –30ºC– **N_2O_3**
- Covalency and oxidation numbers of nitrogen in N_2O_5 is respectively– **4, +5**
- ..... has maximum melting point– **NH_3**
- ..... set of oxide of nitrogen is paramagnetic in monomeric state– **NO, NO_2**
- Metal ..... become passive with conc. HNO_3– **Cr, Al**
- In brown rings test for nitrate ions, brown ring is formed having composition– **$[Fe(H_2O)_5NO]^{2+}$**
- Allotrope of phosphorus is polymeric consisting of chains of P_4 tetrahedral linked together is– **Red phosphorus**
- ..... is dibasic– **Orthophosphorus acid**
- NO_2 is anhydride of– **$HNO_3 + HNO_2$**
- Phosphine on reaction with hydrobromic acid gives– **PH_4Br**
- In P_4O_{10} the number of co-ordinate bonds is– **4**
- Calomel (Hg_2Cl_2) on reaction with NH_4OH gives– **$HgNH_2Cl$**
- Nitrogen is obtained when $NaNO_2$ reacts with– **NH_4Cl**
- ..... is a sesqui oxide– **N_2O_3**
- In solid state PBr_5 exist as– **$[PBr_4]^+ [Br^-]$**
- The metal gives NH_4NO_3 with very dilute HNO_3– **Fe**
- In iodide of Millon's base formed by the reaction of Nessler's reagent with NH_3, the coordination number of Hg will be– **2**
- The compound insoluble in aqueous NH_3 is– **AgI**
- ..... is called mixed anhydride– **NO_2**
- When copper is heated with conc. HNO_3, it produces– **$Cu(NO_3)_2$ and NO_2**
- Strong reducing behaviour of H_3PO_2 is due to– **Presence of one –OH group and two P – H bond**
- ..... species contains three bond pairs and one lone pair around the central atom– **PCl_3**
- How many bridging oxygen atoms are present in P_4O_{10} – **6**
- ..... compounds, nitrogen exhibits highest oxidation state– **N_2H**
- Repeated use of fertilizers would increase the acidity of the soil– **Ammonium sulphate**
- ..... oxides is most acidic– **N_2O_5**
- ..... phosphorus is the most reactive– **White phosphorus**
- The decomposition of organic compounds, in the presence of oxygen and without the development of odoriferous substances, is called– **Decay**
- ..... has P-P linkage– **$H_4P_2O_6$**
- Hybridisation of central 'N' atom is N_2O is– **sp**
- The product obtained as a result of a reaction of nitrogen with CaC_2 is– **$CaCN_2$**

Some Important Compounds of Carbon ans Silicon

- The properties of CO gas is– **It is a colourless gas, It is an odourless gas, It is a neutral oxide**
- Carbonic acid is a– **Weak dibasic acid**
- Organosilicon polymers containing Si–O–Si linkage is called– **Silicones**
- SiO_4^{4-} ion has geometry– **Tetrahedral**
- The silicates which contain discrete tetrahedral units are– **Ortho silicates**
- Silicons are– **Water repelling in nature, With high thermal stability, With high dielectric strength**
- Calcium carbide on hydrolysis gives– **Acetylene**
- Carbon sub-oxide has the formula– **C_3O_2**
- The basic structural unit of silicates is– **SiO_4^{4-}**
- The ..... anions is present in the chain structure of silicates– **$(SiO_3^{2-})_n$**
- The ..... is most basic oxide– **Bi_2O_3**
- The straight chain polymer is formed by– **Hydrolysis of $(CH_3)_2SiCl_2$ followed by condensation polymerisation**
- The element exists in liquid state for a wide range of temperature and can be used for measuring high temperature is– **Ga**
- $AlCl_3$ is a– **Lewis acid**
- Acidic in nature, oxides is– **B_2O_3**
- Boric acid is an acid because its molecule– **Accepts OH^- from water releasing proton**
- Silicon has a strong tendency to form polymers like silicones. The chain length of silicone polymer can be controlled by adding– **Me_3SiCl**

TEAMSKY

Search on TG: @apna_pdf
@apna_pdf

- Ionisation enthalpy (Δ_1H_1kJ mol^{-1}) for the elements of Group 13 follows the order– **B > Al < Ga > In < Tl**
- Quartz is extensively used as a piezoelectric material, it contains– **Si**
- The most commonly used reducing agent is– **$SnCl_2$**
- Dry ice is– **Solid CO_2**
- Cement, the important building material is a mixture of oxides of several elements. Besides calcium, iron and sulphur, oxides of elements the group(s) are present in the mixture are– **Groups 2, 13 and 14**
- The order of atomic radii in group 13 elements is– **B < Ga < Al < In < Tl**
- Borazine, also known as inorganic benzene, can be prepared by the reaction of 3-equivalents of "X" with 6-equivalents of "Y". "X" and "Y"respectively are– **B_2H_6 and NH_3**
- The stability order of group 13 elements in their +1 oxidation state– **Al < Ga < In < Tl**
- C_{60}, an allotrope of carbon contains– **20 hexagons and 12 pentagons**
- The shows nitrogen in its increasing order of oxidation number is– **$NH_4^+ < N_2O < NO < NO_2 < NO_3^-$**
- Nitrogen forms stable N_2 molecule but phosphorus is converted to P_4 from P_2 because– **$p\pi - p\pi$ bonding is weak in phosphorus**
- The Decreasing order of boiling points of the hydrides is– **$SbH_3 > NH_3 > Ash_3 > PH_3$**
- Nitrogen can form only one chloride with chlorine is NCl_3 whereas P can form PCl_3 and PCl_5. This is– **Due to absence of d-orbitals in nitrogen**
- On heating a mixture of NH_4Cl and KNO_2, we get– **N_2**
- Nitrogen is relatively inactive element because– **Dissociation energy of its molecule is fairly high**
- Nitrogen combines with metals to form– **Nitrides**
- Nitrogen is used to fill electric bulbs because– **It does not support combustion**
- The factors would favour the formation of ammonia in Haber's process– **High pressure**
- Ammonia is a Lewis base. It forms complexes with cations does not form complex with ammonia– **Pb^{2+}**
- Ammonia is used in detection of Cu^{2+} ion because– **Aqueous solution of NH_3 reacts with Cu^{2+} ion to form deep blue coloured complex**
- ..... oxide of nitrogen is obtained on heating ammonium nitrate at 250^0C is– **Nitrous oxide**
- ..... the oxides is anhydride of nitrous acid–**N_2O_3**
- Atomicity of phosphorus is– **Four**
- The structure of white phosphorus is– **Tetrahedral**
- When white phosphorus is heated at 473 K under high pressure, it will happen– **β-Black phosphorus is formed**
- Phosphine is prepared by the action of– **P and NaOH**
- Holme's signal uses chemical compound– **Calcium carbide and calcium phosphide**
- In the structure of PCl_5, the P – Cl_{axial} bonds are longer than P – $Cl_{equatorial}$ bond because– **Axial bond pairs suffer more repulsion**
- Total number of P–O–P bonds appear in cyclotrimetaphosphoric acid is– **Three**
- Phosphorous acid on heating gives the products :

  $4H_3PO_3 \xrightarrow{\Delta} 3H_3PO_4 + PH_3$

  This reaction is an example of– **Disproportionation**
- Group 16 elements have lower value of first ionisation enthalpy as compared to group 15 elements because– **Half filled p-orbitals in group 15 elements are more stable**
- Name of the synthetic radioactive element of group 16 having atomic number 116 is– **Livermorium**
- On heating $KClO_3$, we get– **KCl + O_2**
- The correct order of acidic strength is– **$Cl_2O_7 > SO_2 > P_4O_{10}$**
- Sulphur molecule is– **Octa-atomic**
- Sulphur dioxide considered as an air pollutant because– **It causes acid rain due to formation of sulphuric acid on combining with O_2 and H_2O**
- The oxyacid of sulphur that contains a lone pair of electrons on sulphur is– **Sulphurous acid**
- Sulphur is present in +5 oxidation state is– **Dithionic acid**
- The oxidation state of sulphur in the anions SO_3^{2-}, $S_2O_4^{2-}$, and $S_2O_6^{2-}$ follows the order– **$S_2O_4^{2-} < SO_3^{2-} < S_2O_6^{2-}$**
- The order of increasing electron affinity of halogens is– **I < Br < Cl**
- The comparatively high boiling point of hydrogen fluoride is due to– **Formation of hydrogen bonds**
- The element of group 17 whose half life is in milliseconds only is– **Ts**
- Fluorine is the best oxidising agent because it has– **Highest reduction potential**
- ..... is used to prepare Cl_2 gas at room temperature from concentrated HCl– **$KMnO_4$**
- If chlorine is passed through a solution of hydrogen sulphide in water, the solution turns turbid due to the formation of– **Free sulphur**
- Interhalogen compounds are more reactive than the individual halogens because– **X – X' bond is weaker than X – X or X' – X' bonds**

Search on TG: @apna_pdf

@apna_pdf

- Xenon has closed shell configuration but is known to give compounds with fluorine because– **Xe atom has large size and lower ionisation potential as compared to other noble gases**
- The products formed in the reaction of xenon hexafluoride with silicon dioxide is– **$XeOF_4 + SiF_4$**
- Oganesson has been synthetically produced by collision of– **Cf and Ca**
- On addition of conc. H_2SO_4 to a chloride salt, colourless fumes are evolved but in case of iodide salt, violet fumes come out. This is because– **HI gets oxidised to I_2**
- In a cyclotrimetaphosphoric acid molecule, total single and double bonds are present– **3 double bonds; 12 single bonds**
- The elements can be involved in pπ–dπ bonding– **Phosphorus**
- The pairs of ions are isoelectronic and isostructural is– **CO_3^{2-}, NO_3^-**
- Affinity for hydrogen decreases in the group from fluorine to iodine. The halogen acids should have highest bond dissociation enthalpy is– **HF**
- Strong reducing behaviour of H_3PO_2 is due to– **Presence of one – OH group and two P–H bonds**
- On heating, lead nitrate forms oxides of nitrogen and lead. The oxides formed are– **NO_2, PbO**
- Maximum covalency of nitrogen is– **4**
- A brown ring is formed in the ring test for NO_3^- ion. It is due to the formation of– **$[Fe(H_2O)_5(NO)]^{2+}$**
- Elements of group-15 form compounds in +5 oxidation state. However, bismuth forms only one well characterised compound in +5 oxidation state. The compound is– **BiF_5**
- On heating ammonium dichromate and barium azide separately we get– **N_2 in both cases**
- In the preparation of HNO_3, we get NO gas by catalytic oxidation of ammonia. The moles of NO produced by the oxidation of two moles of NH_3 will be– **2**
- The oxidation state of central atom in the anion of compound NaH_2PO_2 will be– **+1**
- Peroxoacids of sulphur are– **H_2SO_5 and $H_2S_2O_8$**
- A black compound of manganese reacts with a halogen acid to give greenish yellow gas. When excess of this gas reacts with NH_3 an unstable trihalide is formed. In this process the oxidation state of nitrogen changes from– **–3 to +3**
- In the preparation of compounds of Xe, Bartlett had taken $O_2^+ PtF_6^-$ as a base compound. This is because– **Both O_2 and Xe have almost same ionisation enthalpy**
- In solid state PCl_5 is a – **Ionic solid with $[PCl_4]^+$ tetrahedral and $[PCl_6]^-$ octahedral**
- Isoelectronic pair is a– **BrO_2^-, BrF_2^+**
- The oxoacid of phosphorous has the highest number of oxygen atoms present in chemical formula is– **Pyrophosphoric acid**
- The interhalogen compound formed from the reaction of bromine with excess of fluorine is a– **Halate**
- Concentrated HNO_3 reacts with iodine to give– **HIO_3, NO_2 and H_2O**
- ..... is used to remove most of plutonium from spent nuclear fuel– **O_2F_2**
- The reaction of zinc with dilute and concentrated nitric acid, respectively produces– **N_2O and NO_2**
- Phosphorus has +3 oxidation state is– **Orthophosphorus acid**
- The oxoacids of phosphorus that is a reducing agent and a monobasic acid as well– **H_3PO_2**
- The number of P–OH bonds and the oxidation state of phosphorus atom in pyrophosphoric acid ($H_4P_2O_7$) respectively are– **Four and Five**
- The pair that contains two P–H bonds in each of the oxoacids is– **H_3PO_2 and $H_4P_2O_5$**
- In the preparation of sulphuric acid, V_2O_5 is used in the reaction which is– **$2SO_2 + O_2 \rightarrow 2SO_3$**
- XeF_6 on partial hydrolysis with water produces a compound 'X'. The same compound 'X' is formed when XeF_6 reacts with silica. The compound 'X' is– **$XeOF_4$**
- BF_3 is planar and electron deficient compound. Hybridization and number of electrons around the central atom, respectively are– **sp^2 and 6**
- Iodine oxidises sodium borohydride to give– **B_2H_6**
- Three centre - two electron bond is present in– **B_2H_6**
- The compounds that is used in cosmetic surgery– **Silicones**
- It is because of inability of ns^2 electrons of the valence shell to participate in bonding that– **Sn^{2+} is reducing while Pb^{4+} is oxidising**
- $(CH_3)_2SiCl_2$ undergoes hydrolysis but $(CH_3)_2CCl_2$ does not. This is because– **d-orbitals are present in valence shell of Si but not in C**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

EXAM POINT

Group-13 to group 18 element

$(NH_4)_2Cr_2O_7$ on heating liberates a gas. The same gas will be obtained by– **Heating NH_4NO_2**	**Karnataka CET-17.06.2022, Shift-II**
The strong reducing property of hypophosphorus acid is due to– **Two P-H bonds**	**Karnataka CET-17.06.2022, Shift-II**
The highest industrial consumption of molecular hydrogen is to produce compound element:– **Nitrogen**	**JEE Main-24.06.2022, Shift-I**
The most stable trihalide of nitrogen is:– **NF_3**	**JEE Main-24.06.2022, Shift-I**
Heating white phosphorus with conc. NaOH solution gives mainly:– **PH_3 and NaH_2PO_2**	**JEE Main-27.06.2022, Shift-I**
The oxoacid of phosphorus that is easily obtained from a reaction of alkali and white phosphorus and has two P-H bonds, is:– **Phosphinic acid**	**JEE Main-29.06.2022, Shift-I**
The number of oxygen atoms bonded to one phosphorus atom in P_4O_6 is– **3**	**AP EAMCET- 2004**
The total number of N-O bonds present in N_2O_5 molecule are:– **6**	**SCRA 2012**
In Haber's process for the manufacturing of ammonia best yields are obtained under which one of the following conditions?– **380°C to 450°C and 200 atm using a catalyst**	**SCRA 2012**
NH_3 on passing through which one is most significantly absorbed?– **P_2O_5**	**SCRA 2012**
In the manufacture of ammonia by Haber process high pressure is maintained because– **the moles of the product are less than the moles of reactants**	**SCRA-2015**
The boiling point of NH_3 is much higher than that of PH_3 because– **NH_3 forms inter-molecular hydrogen bonds**	**SCRA-2015**
Number of sigma bonds in P_4O_{10} is– **16**	**BCECE-2018**
Meta- phosphoric acid is represented by– **HPO_3**	**AP EAMCET- 1994**
Catalyst used in the manufacture of HNO_3 in Ostwald process– **Platinum gauze**	**JEE Main 07.04.2018**
The oxy acid of phosphorus in which phosphorus has the lowest oxidation state is– **Hypophosphorus acid**	**AP EAMCET- 1995**
The industrial preparation of nitric acid by Ostwald's process involves– **Oxidation of NH_3**	**AP EAMCET- 1999**
PCl_3 on hydrolysis gives:– **$HCl + H_3PO_3$**	**AP EAMCET (Medical) - 1998**
Ionic radius (in Å) for As^{3+}, Sb^{3+} and Bi^{3+} follow the order– **$Bi^{3+} > Sb^{3+} > As^{3+}$**	**AP EAMCET (Engg.) 2001**
The oxoacid of sulphur which contains two sulphur atoms in different oxidation states is– **pyrosulphurous acid**	**AP EAMCET (Engg.) 2012**
The product(s) formed when H_2O_2 reacts with disodium hydrogen phosphate is– **$Na_2HPO_4 \times H_2O_2$**	**AP EAMCET (Engg.) 2012**
Nitrogen shows maximum covalency of 4 whereas other heavier elements of the group show higher covalency because,– **it has only 4 orbitals available in the valence shell.**	**COMEDK-2014**
Solid A reacts with strong $NaOH_{(aq)}$ liberating a foul smelling gas B which spontaneously burn in air giving smoky rings. A and B are respectively– **P_{white} and PH_3**	**COMEDK 2014**
N_2 does not show property of catenation because– **interelectronic repulsion between non bonding electrons is greater**	**COMEDK 2015**
The reaction that does not produce PH_3– **White phosphorus with water**	**COMEDK-2015**

Search on TG: @apna_pdf

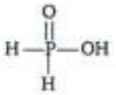
@apna_pdf

PCl_3 on hydrolysis gives– **H_3PO_3**	**COMEDK-2019**
Concentrated nitric acid with aluminium gives– **passive metal**	**COMEDK-2018**
The atomicity of phosphorus is X and the PPP bond angle in the molecule is Y. What are X and Y?– **X = 4, Y = 60°**	**AP-EAMCET (Medical), 2003**
The number of P—O bonds and lone pair of electrons present in P_4O_6 molecule are, respectively– **12, 16**	**AP-EAMCET (Medical), 2008**
Aqueous sodium hydroxide reacts with white phosphorus to form phosphine and:– **NaH_2PO_2**	**AP-EAMCET (Medical), 2001**
Two grams of sulphur is completely burnt in oxygen to form SO_2. In this reaction, what is the volume (in litres) of oxygen consumed at STP? (Atomic weight of sulphur and oxygen are 32 and 16 respectively).– **$\frac{22.4}{16}$**	**AP-EAMCET (Medical), 2002**
When chloroform is exposed to air and sunlight, it gives– **phosgene**	**AIIMS-1994**
The correct order of reducing abilities of hydrides of V group elements is– **$NH_3<PH_3<AsH_3<SbH_3<BiH_3$**	**AP EAMCET-2008**
Hypophosphorus acid is a good reducing agent because– **it contains two P – H bonds**	**Jharkhand – 2019**
P_4O_{10} is not used to dry NH_3 gas because– **P_4O_{10} is acidic and NH_3 is basic**	**[AIIMS-2012]**
H_2S gas is not evolved when SO_3^{2-} ion reacts with reagents–**Al + Conc.NaOH**	**[AIIMS-2009]**
In the nitrogen family the H - M - H bond angle in the hydrides MH_3 gradually becomes closer to 90° on going from N to Sb. This shows that gradually– **Almost pure p-orbitals are used for M - H bonding**	**[AIIMS-2009]**
Choose the correct statement:–**White or yellow phosphorus is stored under wate**	**[AIIMS-2009]**
The compound, found in nature in gas phase but ionic in solid state is:– **PCl_5**	**[AIIMS-2006]**
The number of P–O–P bridges in the structure of phosphorus pentoxide and phosphorus trioxide are respectively:– **6, 6**	**[AIIMS-2005]**
The element which forms oxides in all oxidation states varying from +1 to +5 is– **N**	**[AIIMS-2004]**
The statement true for N_3^- is:– **the formal oxidation state of nitrogen in this anion is –1**	**[AIIMS-2004]**
The true statement for the acids of phosphorus. H_3PO_2, H_3PO_3 and H_3PO_4 is :– **the geometry of phosphorus is tetrahedral in all the three**	**[AIIMS-2003]**
The laughing gas is:– **N_2O**	**[AIIMS-1998]**
Phosphine is generally prepared in the laboratory:– **By heating white phosphorus with an aqueous solution of caustic potash**	**JEE Main 14.01.2020**
Group 15 elements have more electron gain enthalpy than group 16-elements. The correct reason for this is– **Half-filled stability of gp. 15 elements**	**VITEEE-2016**
With excess of water, both P_2O_5 and PCl_5 give– **H_3PO_4**	**VITEEE-2015**
When copper is treated with a certain concentration of nitric acid, nitric oxide and nitrogen dioxide are liberated in equal volumes according to the equation, $xCu + yHNO_3 \rightarrow Cu(NO_3)_2 + NO + NO_2 + H_2O$ The coefficients of x and y are respectively– **2 and 6**	**VITEEE-2015**
Reaction of PCl_3 and PhMgBr would give– **triphenylphosphine**	**VITEEE- 2008**
NH_3 group in a coordination compound is named as– **ammine**	**VITEEE- 2006**
The total number of σ and π -bonds in pyrophosphoric acid are respectively–**12, 2**	**AP-EAMCET- (Engg.)-2011**
Calgon is– **$Na_6P_6O_{18}$**	**AP-EAMCET – 2016**
The number of oxygen atoms bonded to each phosphorus atom in P_4O_{10} is :– **4**	**AP-EAMCET (Engg.)-2004**
The oxide of nitrogen formed by thermal decomposition of NH_4NO_3 is– **N_2O**	**AP-EAMCET- (Engg.) - 2010**

TEAM SBW

Search on TG: @apna_pdf

@apna_pdf

Solvay process is used in the manufacture of– **Na_2CO_3**	**AP-EAMCET- (Engg.) - 2010**
The decreasing order of boiling points of V group hydrides– **$SbH_3 > NH_3 > AsH_3 > PH_3$**	**AP - EAMCET (Medical) - 2007**
P – O – P bond is present in– **pyrophosphoric acid**	**SRMJEEE – 2013**
The number of P–O–P bonds in trimetaphosphoric acid is– **3**	**AMU-2019**
The number of nitrogen-nitrogen bonds in N_2O_5– **0**	**AMU-2017**
The number of P–O–P bonds in cyclic meta phosphoric acid is– **three**	**AMU-2016**
P_4O_{10} dissolves in water to give– **orthophosphoric acid**	**AMU-2011**
Phosphine can be prepared by the reaction of water with– **calcium phosphide**	**AMU – 2010**
In the structure of P_4O_{10} molecule the number of σ(sigma) and π(pi) bonds are– **16 sigma and 4 pi**	**AMU – 2008**
Carius method is used for the quantitative estimation of– **halogens**	**AMU–2006**
In P_4O_6, the number of oxygen atoms bonded to each phosphorus atom is– **3**	**AMU–2001**
The oxidation state of phosphorous in H_3PO_3, $H_4P_2O_6$ and $H_4P_2O_7$, respectively are– **+3, +4, +5**	**Assam CEE-2021**
The sides of safety matches contains– **red phosphorus + sand powder**	**BCECE-2007**
Zinc and cold dil. HNO_3 reacts to produce– **NH_4NO_3**	**BCECE-2007**
The element kept in water– **White phosphorus**	**BCECE-2005**
The most favourable condition for the manufacture of NH_3 is:– **low temperature and high pressure**	**BCECE-2004**
The product (s) formed when H_2O_2 reacts with disodium hydrogen phosphate is– **Na_2HPO_4. H_2O_2**	**BCECE-2014**
Hydrolysis of PCl_3 produces– **$H_3PO_3 + HCl$**	**BCECE-2016**
Sodium pyrophosphate is– **$Na_4P_2O_7$**	**[BITSAT-2008]**
Formula of hypophosphorus acid is :– 	**BCECE-2005**
The nitrogen with its increasing order of oxidation number– **$NH_4^+ < N_2O < NO < NO_2 < NO_3^-$**	**[BITSAT-2017]**
Nitrogen is obtained by the thermal decomposition of:– **NH_4NO_2**	**[BITSAT-2021]**
The bond present in N_2O_5 are– **covalent and coordinate**	**CG PET- 2013**
The compound added to prevent chloroform to form phosgene gas (poisonous gas) is– **C_2H_5OH**	**CG PET -2007**
The element which liberates oxygen gas from water is– **F**	**CG PET -2007**
Very dilute nitric acid reacts with zinc to form zinc nitrate and– **ammonium nitrate**	**CG PET -2007**
The passivity of iron in concentrated nitric acid is due to– **a thin oxide layer coating on the metal**	**CG PET -2004**
When heated NH_3 is passed over CuO gas evolved is:– **N_2**	**BCECE-2005**
In the following reaction $P_4 + 3NaOH + 3H_2O \rightarrow PH_3 + 3NaH_2PO_2$ – **phosphorus is oxidised and reduced**	**CG PET -2004**
The formula of phosphate of a metal, M is MPO_4. The formula of its nitrate will be– **$M(NO_3)_3$**	**CG PET -2006, 2004**
In the mixture of conc. H_2SO_4 and HNO_3 the nitration species is– **NO_2^+**	**CG PET -2005**
A deep brown gas is formed by mixing two colourless gases which are– **NO and O_2**	**CG PET -2005**

Search on TG: @apna_pdf

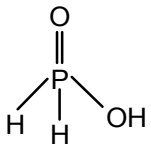
@apna_pdf

Concentrated HNO_3 oxidize white phosphorus into which substance?– **H_3PO_4**	**GUJCET-2020**
For the hydrides of nitrogen family, in going down the group:– **Stability decreases**	**HP CET-2018**
PCl_3 and PCl_5 both exist; NCl_3 exists but NCl_5 does not exist. It is due to– **availability of vacant d-orbital in P but not in N**	**(AIEEE 2002)**
Good reducing nature of H_3PO_2 is attributed to the presence of– **two P–H bonds**	**(JEE Main 2019, 9 Jan Shift-II)**
The metal that forms nitride by reacting directly with N_2 of air, is– **Li**	**(JEE Main 2019, 9 Jan Shift-II)**
The pair that contains two P–H bonds in each of the oxoacids is– **H_3PO_2 and $H_4P_2O_5$**	**(JEE Main 2019, 10 Jan Shift-II)**
The species in which the N-atom is in a state of sp hybridisation is– **NO_2^+**	**(JEE main 2016)**
The pair in which phosphorus atoms have a formal oxidation state of +3 is– **orthophosphorus and pyrophosphorous acids**	**(JEE Main 2016)**
The oxide without nitrogen-nitrogen bond is– **N_2O_5**	**(JEE Main 2021, 1 Sep Shift-II)**
The oxidation states of 'P' in $H_4P_2O_7$, $H_4P_2O_5$ and $H_4P_2O_6$ respectively are– **5, 3 and 4**	**(JEE Main 2021, 27 July Shift-I)**
Chemical nature of the nitrogen oxide compound obtained from a reaction of concentrated nitric acid and P_4O_{10} (in 4:1 ratio) is– **acidic**	**(JEE Main 2021, 20 July Shift-I)**
The number of ionisable hydrogens present in the product obtained from a reaction of phosphorus trichloride and phosphonic acid is– **2**	**(JEE Main 2021, 18 March SHift-I)**
The set that represents the pair of neutral oxides of nitrogen is– **NO and N_2O**	**(JEE Main 2021, 17 March Shift-II)**
The number hydrogen atom(s) attached to phosphorus atom in hypophosphorous acid is– **two**	**(AIEEE 2005)**
In a molecule of pyrophosphoric acid, the number of P–OH, P = O and P–O–P bonds/moiety(ies) respectively are– **4, 2, and 1**	**(JEE Main 2020, 3 Sep Shift-I)**
Reaction of ammonia with excess Cl_2 gives– **NCl_3 and HCl**	**(JEE Main 2020, 5 Sep Shift-II)**
The reaction of NO with N_2O_4 at 250 K gives– **N_2O_3**	**(JEE Main 2020, 6 Sep Shift-II)**
Phosphorus pentoxide (P_2O_5) is the starting material for phosphate esters used as surfactants and extraction agents. P_2O_5 is extensively used as.– **dehydrating agent**	**J & K CET-(2017)**
In P_4O_{10} the number of oxygen atoms bonded to each phosphorus atom is– **3**	**J & K CET-(1998)**
Oxidation state of phosphorus in pyrophosphoric acid is :– **+5**	**JCECE - 2006**
Kjedahl's method can be used for estimation of nitrogen in– **$C_6H_5NH_2$**	**JCECE - 2011**
The maximum covalency of nitrogen is– **4**	**JCECE - 2013**
The number of σ-bons in P_4O_{10} is– **16**	**JCECE - 2014**
In Ostwald's process ……. is used as catalyst– **Pt**	**JCECE – 2018, BCECE-2005**
$4HNO_3 + P_4O_{10} \rightarrow 4HPO_3 + X$, X is– **$N_2O_5$**	**JCECE - 2018**
Yellow phosphorus is kept in– **water**	**JIPMER-2004**
Duma's method involves the determination of nitrogen content in the organs compound in the form of– **N_2**	**JIPMER-2016**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

Phosphorus pentachloride– **On hydrolysis gives an oxo-acid of phosphorus which is tribasic**	**Karnataka-CET-2020**
In the reaction of gold with aquaregia, oxidation state of nitrogen changes from– **+ 5 to +2**	**Karnataka-CET-2019**
When PbO_2 reacts with concentrated HNO_3, the gas evolved is– **O_2**	**Karnataka-CET-2018**
Among the oxyacids of phosphorus, the dibasic– **H_3PO_3**	**Kerala-CEE-2010**
The least stable hydride of 15^{th} group elements is– **BiH_3**	**Kerala-CEE-2011**
PCl_3 is stored in a well stoppered bottle since– **It decomposes in the presence of moisture**	**Kerala-CEE-2019**
Acetic acid in liquid ammonia behaves as– **Stronger acid than that in water**	**Kerala-CEE-2019**
The oxyacid of phosphorus that contains one P-OH, two P-H and one P=O bonds is– **Phosphinic acid**	**Kerala-CEE-2020**
In the reaction,$P_2O_5 + 3CaO \rightarrow Ca_3(PO_4)_2$, P_2O_5 acts as :– **acidic flux**	**Manipal-2019**
Oxidation state of nitrogen in nitric oxide is– **+2**	**MHT CET-03.05.2019, SHIFT-I**
The laughing gas is– **N_2O**	**[BITSAT-2016], MHT CET-2012**
PH_4I + NaOH forms– **PH_3**	**(NEET-1991)**
PCl_3 reacts with water to form– **H_3PO_3, CHl**	**(NEET-1991)**
Strong reducing behaviour of H_3PO_2 is due to– **presence of one–OH group and two P–H bonds**	**(NEET-2015)**
Oxidation state of P in $H_4P_2O_5$, $H_4P_2O_4$, $H_4P_2O_7$ are respectively– **+3, +4, +5**	**(NEET-2010)**
How many bridging oxygen atoms are present in P_4O_{10}?– **6**	**(NEET-Mains 2010)**
The structural formula of hypophosphrous acid is– 	**(NEET-1997)**
H_3PO_2 is the molecular formula of an acid of phosphorus. Its name and basicity respectively are– **hypophosphorous acid and one**	**(NEET-1992)**
P_2O_5 is heated with water to give– **Orthophosphoric acid**	**(NEET-1991)**
Basicity of orthophsphoric acid is– **3**	**(NEET-1991)**
When orthophosphoric acid is heated to 600 ºC, the product formed is– **HPO_3**	**(NEET-1989)**
The basic character of hydrides of the V group elements decreases in the order– **$NH_3 > PH_3 > AsH_3 > SbH_3$**	**(NEET-1996)**
Number of electrons shared in the formation of nitrogen molecule is– **6**	**(NEET-1992)**
Nitrogen is relatively inactive element because– **dissociation energy of its molecule is fairly high**	**(NEET-1992)**
Pure nitrogen is prepared in the laboratory by heating a mixture of– **$NH_4Cl + NaNO_2$**	**(NEET-1991)**
Urea reacts with water to form A which will decompose to form B. B when passed through $Cu^{2+}(aq)$ deep blue colour solution C is formed. What is the formula of C from the following?– **$[Cu(NH_3)_4]^{2+}$**	**(NEET 2020)**
Aqueous solution of ammonia consists of– **NH_4^+ and OH^-**	**(NEET-1991)**
When copper is heated with conc. HNO_3 if produces– **$Cu(NO_3)_2$, NO and NO_2**	**(NEET-I 2016)**
If the atomic number of an element is 33, it will be placed in the periodic table in the– **fifteenth group**	**NEET-1993**
Number of unpaired electrons in N^{2+} is/are– **1**	**NEET-1989**

Search on TG: @apna_pdf

@apna_pdf

Find the basicity of the following acids: Hypophosphorous acid, metaphosphoric acid, phosphorous acid, orthophosphoric acid, pyrophosphoric acid.– **1,1,2,3,4**	**Tripura JEE-2021**
The number of P – O bonds in P_4O_{10} is– **16**	**UP CPMT-2010**
On hydrolysis PCl_3 gives– **H_3PO_3**	**UP CPMT-2007**
PCl_5 is possible but NCl_5 does not exist– **in N, d–sub-shell is absent**	**UP CPMT-2006**
In pyrophosphoric acid, the number of hydroxyl groups are– **4**	**UP CPMT-2001**
NH_3 gas is dried over:– **CaO**	**UPTU/UPSEE-2005**
In the following Haber synthesis of NH_3, the equilibrium constant for NH_3 formation, on increase in temperature, is $N_2(g)+3H_2(g) \rightleftharpoons 2NH_3(g)+$ heat energy– **decreased**	**UPTU/UPSEE-2011**
The conjugated base of hydrazoic acid is– **N_3^-**	**UPTU/UPSEE-2010**
Among NH_3, HNO_3, NaN_3 and Mg_3N_2 the number of molecules having nitrogen in negative oxidation state is– **3**	**UPTU/UPSEE-2008**
During the preparation of NH_3 in Haber's process, the promoter (s) used is/are– **Mo**	**WB-JEE-30.04.2022**
Atoms in a P_4 molecule of white phosphorus are arranged regularly in the following way– **at the corners of a tetrahedron**	**WB-JEE-2009**
P_4O_{10} is the anhydride of– **H_3PO_4**	**WB-JEE-2010**
The number of acidic protons in H_3PO_3 are– **2**	**WB-JEE-2012**
Nitric acid can be obtained from ammonia via the formations of the intermediate compounds– **nitric oxide and nitrogen dioxide**	**WB-JEE-2013**
Sulphuryl chloride (SO_2Cl_2) reacts with white phosphorus (P_4) to give– **PCl_5, SO_2**	**WB-JEE-2015**
In the solid state, PCl_5 exists as– **$[PCl_4]^+$ and $[PCl_6]^-$ ions**	**WB-JEE-2016**
Very pure N_2 can be obtained by– **thermal decomposition of sodium azide**	**Karnataka-CET-2018**
The H – N – H angle in ammonia is 107.6°, while the H–P–H angle in phosphine is 93.5°. Relative to phosphine, the p-character of the lone-pair on ammonia is expected to be– **Less**	**WB-JEE-2019**
Conjugate base of $H_2PO_4^-$ is– **HPO_4^{2-}**	**Karnataka-CET-2013**
The correct order of melting points of hydrides of group 16 elements is:– **$H_2S < H_2Se < H_2Te < H_2O$**	**JEE Main-26.06.2022, Shift-I**
The basicities of H_3PO_3 and $H_4P_2O_7$, respectively, are– **2 and 4**	**AMU-2019**
The catalyst used in the manufacture of sulphuric acid by contact process is– **V_2O_5**	**J&K CET-2007, JCECE-2003** **AP EAMCET- 1993**
The crystalline form of sulphur that is stable at room temperature is– **Rhombic sulphur**	**AP EAMCET- 1994**
SF_6 is a kinetically inert substance because– **It is sterically protected**	**AP EAMCET (Engg.) 17.09.2020, Shift-II**
The type of bonds present in sulphuric anhydride are– **3σ, one pπ-dπ and two pπ - dπ**	**AP EAMCET (Engg.)-2009**
When some helium gas is added, at constant pressure, to an equilibrium mixture of $2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$. Which of the following conditions will occur?– **Concentration of Sulphur dioxide increases**	**AP EAPCET-6 Sep. 2021, Shift-II**
Sulphuric acid has high viscosity because of– **The presence of hydrogen bonds**	**COMEDK 2011**
An element belonging to chalcogen group is– **sulphur**	**COMEDK-2015**
For the preparation of sodium thiosulphate by Springs reaction the reactants used are:– **$Na_2S + Na_2SO_3 + I_2$**	**AP-EAMCET (Medical), 2003**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

O_2^{2-} is the symbol of…… ion.–	**Peroxide**	**AP-EAMCET (Medical), 2003**
Fluorine oxidises HSO_4^- to :–	**$S_2O_8^{2-}$**	**AP-EAMCET (Medical), 2002**
Commercial name of Peroxydisulphuric acid is–	**Marshall's acid**	**TS EAMCET 06.08.2021**
Oxygen is more electronegative than sulphur, yet H_2S is acidic while H_2O is neutral. This is because–	**H–S bond is weaker than H–O bond**	**[AIIMS-2012]**
The element which is the most abundant in the earth crust is–	**O**	**[AIIMS-2007]**
Hypo on treatment with iodine produces:–	**$Na_2S_4O_6$**	**[AIIMS-2000]**
H_2S does produce metallic sulphide with :–	**$COCl_2$**	**[AIIMS-1997]**
The sodium extract of an organic compound on acidification with acetic acid and addition of lead acetate solution gives a black precipitate. The organic compound contains–	**sulphur**	**VITEEE-2014**
Out of $H_2S_2O_3$, $H_2S_2O_4$, H_2SO_5, and $H_2S_2O_8$ peroxy acids are–	**H_2SO_5, $H_2S_2O_8$**	**VITEEE-2013**
The oxidation numbers of sulphur in S_8, SO_2 and H_2S respectively are–	**0, +4, – 2**	**AP- EAMCET(Medical) - 2010**
The first four elements in group 16 are collectively known as–	**chalcogens**	**SRMJEEE – 2010**
The anhydride of H_2SO_4 is–	**SO_3**	**SRMJEEE – 2011**
The number of cations produced by Mohr's salt in solution is–	**3**	**SRMJEEE-2015**
Basicity of dithionic acid is–	**two**	**AMU-2019**
The number of S–S bonds in sulphur trioxide trimer (S_3O_9) is–	**0**	**AMU-2019**
Arrange H_2O, H_2S and H_2Se in order of increasing acidity.–	**$H_2O < H_2S < H_2Se$**	**AMU-2017**
The acidity of hydrides of O, S, Se and Te varies in the order–	**$H_2O < H_2S < H_2Se < H_2Te$**	**AMU-2005**
Hypo phosphorus acid, H_3PO_2 is:–	**a monobasic acid**	**BCECE-2006**
In presence of moisture, SO_2 can:–	**act as reductant**	**BCECE-2006**
Fuming sulphuric acid is:–	**$H_2SO_4 + SO_3$**	**BCECE-2004**
The oxoacid of sulphur which contains two sulphur atoms in different oxidation states is–	**pyrosulphurous acid**	**BCECE-2014**
Sulphur (s) when react with HNO_3 (conc.) mainly gives–	**H_2SO_4, NO_2 and H_2O**	**BCECE-2017**
Caro's acid is–	**H_2SO_5**	**[BITSAT-2005]**
Bleaching action of SO_2 is due to its–	**reducing property**	**[BITSAT-2007]**
In the formation of SO_3 according to following equilibrium $2SO_2 + O_2 \rightleftharpoons 2SO_3 + \text{Heat}$, which conditions favour the formation of SO_3?–	**Low temperature and used of catalyst**	**CG PET -2004**
The formula of phosphate of a metal, M is MNH_4PO_4. The formula of its sulphate will be–	**MSO_4**	**CG PET -2004**
In manufacturing of sulphuric acid in presence of platinum catalyst, which metal impurity acts as catalytic poison?–	**Cr**	**GUJCET-2018**
The catalyst used in the manufacture of sulphuric acid by contact process–	**Platinised asbestos**	**AP EAMCET- 2000**
The number of bonds between sulphur and oxygen atoms in $S_2O_8^{2-}$ and the sulphur atoms in rhombic sulphur, respectively, are rhombic sulphur, respectively, are–	**8 and 8**	**(JEE Main 2020, 8 Jan Shift-I)**
The acidic, basic and amphoteric oxides, respectively, are–	**N_2O_3, Li_2O, Al_2O_3**	**(JEE Main 2020, 9 Jan Shift-I)**
When the first electron gain enthalpy ($\Delta_{eg}H$) of oxygen is –141 kJ/mol, its second electron gain enthalpy is–	**a positive value**	**(JEE Main 2019, 9 Jan Shift-II)**

Search on TG: @apna_pdf

@apna_pdf

Number of paramagnetic oxides among the following given oxides is Li_2O, Na_2O_2, KO_2, MgO and K_2O– **1**	**(JEE Main 2021, 1 Sep Shift-II)**
In polythionic acid, $H_2S_xO_6$(X = 3 to 5) the oxidation state(s) of sulphur is/are– **0 and +5**	**(JEE Main 2021, 27 Aug Shift-I)**
The product obtained from the electrolytic oxidation of acidified sulphate solutions, is– **HO_3SOOSO_3H**	**(JEE Main 2021, 27 July Shift-I)**
Chalcogen group elements are– **Se, Te and Po**	**(JEE Main 2021, 26 Aug Shift-II)**
The catalyst for the oxidation of SO_2 to SO_3 and the manufacture of sulphuric acid by contact process is– **V_2O_5**	**J & K CET-(2019)**
The oxyacid of sulphur that contains a lone pair of electrons on sulphur is– **Sulphurous acid**	**J & K CET-(2011)**
The molecular formula of dithionic acid is– **$H_2S_2O_6$**	**J & K CET-(2006)**
The mass of carbon anode consumed (giving only carbondioxide) in the production of 270 kg of aluminium metal from bauxite by the Hall process is (Atomic mass Al = 27)– **90 kg**	**JCECE - 2012**
Sulphur in +3 oxidation state is present in– **Dithionous acid**	**JCECE - 2015**
When a sulphur sol is evaporated, sulphur is obtained. On mixing with water, sulphur sol is not formed. The sol is– **Hydrophobic**	**JCECE - 2017**
……. is polyatomic molecule– **Sulphur**	**JCECE - 2018**
Oxidation state of oxygen in F_2O is– **+ 2**	**JIPMER-2009 Manipal -2017**
Sulphur sol contains– **Large aggregates of S molecules**	**Karnataka-CET-2016**
Excess of PCl_5 reacts with concentrated H_2SO_4 giving– **Sulphuryl chloride**	**Karnataka-CET-2013**
Concentrated sulphuric acid can be reduced by– **NaBr**	**Kerala-CEE-2009**
The H—S—H bond angle in H_2S– **92.1°**	**MHT CET-02.05.2019, SHIFT-III**
The oxidation state of sulphur in $H_2S_2O_7$ is– **+6**	**MHT CET-02.05.2019, SHIFT-II**
In ozone molecule the formal charge on the central oxygen atom is– **+1**	**MHT CET-02.05.2019, SHIFT-II**
The oxidation number of sulphur in S_8 molecule is– **0**	**MHT CET-02.05.2019, SHIFT-II**
Ozone is present as a chief constituent in– **Stratosphere**	**MHT CET-2014**
Oleum is– **$H_2S_2O_7$**	**(NEET-1991)**
The angular shape of ozone molecule (O_2) consists of– **2σ and 1π bond**	**(NEET-2008)**
The gases respectively absorbed by alkaline pyrogallol and oil of cinnamon are– **O_2, O_3**	**(NEET-1989)**
Acidity of diprotic acids in aqueous solutions increases in the order– **$H_2S < H_2Se < H_2Te$**	**(NEET-2014)**
It is possible to obtain oxygen from air by fractional distillation because– **oxygen has higher boiling point than nitrogen**	**(NEET-1989)**
The oxidation states of sulphur in the anions SO_3^{2-}, $S_2O_4^{2-}$ and $S_2O_6^{2-}$ follow the order– **$S_2O_4^{2-} < SO_3^{2-} < S_2O_6^{2-}$**	**UP CPMT-2011**
Peroxide bond is absent in– **$(S_2O_7)^{2-}$**	**UP CPMT-2009**
Difference between S and S^{2-} as S^{2-} has– **larger radii and large size**	**UP CPMT-2007**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

Ozone is used for purifying water because– **kills bacteria, cyst, fungi and acts as a biocide**	**UP CPMT-2007**
Oxidation number of sulphur in $H_2S_2O_8$ is– **+6**	**UP CPMT-2005 JCECE - 2003**
Industrial name of $H_2S_2O_7$ is– **oleum**	**UP CPMT-2004**
The oxidation number of sulphur in $Na_2S_2O_3$– **+2**	**UP CPMT-2002**
If a species has 16 protons, 18 electrons and 16 neutrons, the symbol (with charge) of species is– **S^{2-}**	**UPTU/UPSEE-2010**
'Sulphan' is– **100% oleum (a mixture of 100% SO_3 in 100% H_2SO_4)**	**WB-JEE-2013**
Electrolysis of X gives Y at anode. Vaccum distillation of Y gives H_2O_2. The number of peroxy (O-O) bonds present in X and Y respectively, are– **0, 1**	**AP EAMCET- 2006**
Polar stratospheric clouds facilitate the formation of:– **HOCl**	**JEE Main-26.06.2022, Shift-I**
HIO_3 on heating at 170°C give:– **I_2O_5**	**CG PET-22.05.2022**
The deep color produced when iodine is dissolved in solution of potassium iodide is caused by the presence of– **I_3^-**	**AP EAMCET- 1993**
The element which can displace three other halogens from their compounds is– **F**	**AP EAMCET- 1996, 98**
The most basic element is– **Iodine**	**MPPET- 2009**
In the manufacturing of I_2 from the solution of chile salt petre, left after the crystallization of $NaNO_3$, IO_3^- is generally reduced to I^- with– **$NaHSO_3$**	**S. C. R. A - 2014**
Tincture of iodine contains– **KI**	**SCRA-2010**
Hybridized state of bromine in bromine pentafluoride is– **sp^3d^2**	**COMEDK-2015**
The decreasing order of stability of oxides of halogen is– **iodine > chlorine > bromine > fluorine**	**COMEDK-2015**
The correct order of bond dissociation enthalpy of halogens is:– **$Cl_2 > Br_2 > F_2 > I_2$**	**JEE Main-25.02.2021, Shift-II**
One mole of fluorine is reacted with two moles of hot and concentrated KOH. The products formed are KF, H_2O and O_2. The molar ratio of KF, H_2O and O_2 respectively is– **2 : 1 : 0.5**	**[AIIMS-27 May, 2018(E)]**
In ClF_2^- and ClF_4^- find out the number of lone pair and shape– **3-Linear, 2-Square planar**	**[AIIMS-27 May, 2018(M)]**
When chlorine reacts with cold and dilute solution of sodium hydroxide, the products obtained are– **$Cl^- + ClO^-$**	**[AIIMS-2013]**
When chlorine water is added to a solution of KBr, the solution immediately turns orange red, because– **of the formation of BrCl**	**[AIIMS-2009]**
Iodine exists in which form in iodised salt– **$NaIO_3$**	**[AIIMS-2009]**
The element which can displace three other halogens from their compounds is:– **F**	**AP EAMCET (Medical) - 1998**
Bond energy of Cl_2, Br_2 and I_2 follow the order– **$Cl_2 > Br_2 > I_2$**	**AP EAMCET (Engg.) - 2012**
The correct order of increasing electron affinity of halogens is– **I < Br < F < Cl**	**MPPET-2008**
Bond dissociation energies of HF, HCI, HBr follow the order .....– **HF > HCI > HBr**	**AP EAMCET (Engg.) 2001**
For electron affinity of halogens– **F > I**	**[AIIMS-2004]**
The strongest oxidising agent is– **F_2**	**[AIIMS-2001]**
Iodide of Millon's base is– **$NH_2HgO.HgI$**	**[AIIMS-1999]**
Chlorine acts as a bleaching agent only in presence of:– **Moisture**	**[AIIMS-1998]**
The correct order of increasing oxidising power is:– **$I_2 < Br_2 < Cl_2 < F_2$**	**[AIIMS-1997]**

Search on TG: @apna_pdf

@apna_pdf

The correct order of the thermal stability of hydrogen halides (H–X) is– **HF > HCl > HBr > HI**	**VITEEE-2018**
Transition metals usually exhibit highest oxidation states in their– **fluorides**	**VITEEE- 2010**
The element with atomic number 117 if discovered would be placed in– **halogen family**	**AMU – 2009**
Moist iodine reacts with ozone to give– **HIO_3**	**Assam CEE-2014**
Iodine stains on clothes can be removed by– **$Na_2S_2O_3$**	**Assam CEE-2014**
When chlorine is passed through concentrated solution of KOH, the compound formed is:– **$KClO_3$**	**BCECE-2006**
Strongest oxidising agent among halogen is:– **F_2**	**BCECE-2006**
Correct order of reactivity:– **$F_2 > Cl_2 > Br_2 > I_2$**	**BCECE-2004**
Highest electron affinity among the following is– **chlorine**	**BCECE-2008**
In fluorine group of Periodic Table, on going down– **ionic radius increases**	**BCECE-2011**
Conc·HNO_3 reacts with I_2 to form– **HIO_3**	**BCECE-2010**
The correct order of reactivity of halogens with alkalies is– **F > Cl > Br > I**	**[BITSAT-2010]**
When chlorine water is exposed to sunlight, O_2 is liberated. Hence,– **hydrogen has more affinity to chlorine**	**[BITSAT-2012]**
Starch can be used as an indicator for the detection of traces of– **Iodine in aqueous solution**	**[BITSAT-2014]**
When chlorine water is added to an aqueous solution of sodium iodide in the presence of chloroform, a violet colouration is obtained. On adding more of chlorine water and vigorous shaking, the violet colour disappears. This shows the conversion of ……. into…….– **I_2, HIO_3**	**[BITSAT-2019]**
The strongest oxidising agent amongst F_2, Cl_2, Br_2 and I_2 is– **F_2**	**CG PET -2007**
Chlorine cannot displace– **Fluorine from NaF**	**CG PET -2007**
Fluorine forms chemical compounds with– **Xe**	**CG PET -2004**
The correct sequence of decrease in size of the following species is– **$I^- > I > I^+$**	**CG PET -2005**
Strongest bond among halogens is in– **Cl_2**	**CG PET- 2015**
Hypochlorous acid is– **HOCl**	**CG PET- 2010**
The shape/structure of **$[XeF_5]^-$** and XeO_3F_2, respectively, are– **pentagonal planar and trigonal bipyramidal**	**(JEE Main 2020, 2 Sep Shift-II)**
The correct order of the thermal stability of hydrogen halides (H – X) is– **HF > HCl > HBr > HI**	**(AIEEE 2005)**
Number of Cl = O bonds in chlorous acid, chloric acid and perchloric acid respectively are– **1, 2 and 3**	**(JEE Main 2021, 27 July Shift-II)**
The absolute value of the electron gain enthalpy of halogens satisfies– **Cl > F > Br > I**	**(JEE Main 2021, 17 March Shift-I)**
The correct order of bond dissociation enthalpy of halogens is–**$Cl_2 > Br_2 > F_2 > I_2$**	**(JEE Main 2021, 25 Feb Shift-II) (NEET-I 2016)**
Iodine reacts with concentrated HNO_3 to yield Y along with other products. The oxidation state of iodine in Y, is– **5**	**(JEE Main 2019, 12 Jan Shift-I)**
Chlorine on reaction with hot and concentrated sodium hydroxide gives– **Cl^- and ClO_3^-**	**(JEE Main 2019, 12 Jan Shift-II)**
Total number of lone pair of electron in I_3^- ion is– **9**	**(JEE Main 2018)**
The products obtained when chlorine gas reacts with cold and dilute aqueous NaOH are– **Cl^- and ClO^-**	**(JEE Main 2017)**

TEAM SKY

Search on TG: @apna_pdf

KI and $CuSO_4$ solutions on mixing produce– **$Cu_2I_2 + I_2 + K_2SO_4$**	**BCECE-2007**
The correct order of decreasing acid strength among the following acids is– **HC*l*O >HBrO >HIO**	**J & K CET-(2019)**
The most powerful oxidising agent of the following is– **F_2**	**J & K CET-(2009)**
The bond dissociation energy of Cl_2, Br_2 and l_2 follow the order– **$Cl_2 > Br_2 > I_2$**	**J & K CET-(2006)**
The strongest reducing agent among the following is– **I^-**	**J & K CET-(2004)**
The correct order of increasing oxidising power is– **$I_2 < Br_2 < Cl_2 < F_2$**	**J & K CET-(2003)**
The acidic strength of halogen acids increases from– **HF < HC*l* < HBr < HI**	**J & K CET-(1997)**
The oxidizing ability of halogens– **decreases from fluorine to iodine**	**J & K CET-(1997)**
The correct order of increasing oxidizing character of oxoacids of chlorine– **$HClO_4 < HClO_3 < HClO_2 < HClO$**	**J & K CET-(2013)**
Oxidation number of fluorine is – 1 in:– **NF_3**	**JCECE - 2004**
Water is oxidized to oxygen by:– **Fluorine**	**JCECE - 2005**
Freon used as refrigerant is– **CCl_2F_2**	**JCECE - 2007**
In the conversion of Br_2 to BrO_3^-, the oxidation number of Br changes from– **zero to + 5**	**JCECE - 2009**
The method is used to find halogen in organic compound– **Carius method**	**JIPMER-2019**
Consider the reaction, $H_2 + X_2 \longrightarrow 2HX$, where X is halogen. The reactivity of halogens decrease in the order of– **$F_2 > Cl_2 > Br_2 > I_2$**	**JIPMER-2016**
Ozone when reacts with potassium iodide solution liberates certain product, which turns starch paper blue. The liberated substance is– **iodine**	**Manipal-2019**
Least stable oxide of chlorine is– **Cl_2O**	**BCECE-2007**
The highest oxidation state exhibited by group 17 elements– **+7**	**MHT CET-2016**
When CI_2 gas reacts with hot and concentrated sodium hydroxide solution, the oxidation number of chlorine changes from– **zero to – 1 and zero to +5**	**(NEET-2012)**
When chlorine is passed over dry slaked lime at room temperature, the main reaction product is– **$CaOCl_2$**	**(NEET-1992)**
In the manufacture of bromine from sea water, the mother liquor containing bromides is treated with– **chlorine**	**(NEET-1992)**
The bleaching action of chlorine is due to– **oxidation**	**(NEET-1991)**
The variation of the boiling points of the hydrogen halides is the order HF > HI > HBr > HCI What explains the higher boiling point of hydrogen fluoride?– **There is strong hydrogen bonding between HF molecules**	**(NEET-2015)**
Iodine value is related to– **fats and oils**	**UP CPMT-2011**
Chloroform, when kept open is oxidized to– **$COCl_2$**	**UP CPMT-2004**
Fluorine reacts with water to produce– **$HF + O_2 + O_3$**	**UP CPMT-2001**
The total number electrons present in all the p-orbitals of bromine is– **17**	**UP CPMT-2001**
Fluorine exhibits an oxidation state of only-1 because:– **It is very strongly electronegative**	**UPTU/UPSEE-2006**
Iodine is a:– **molecular solid**	**UPTU/UPSEE-2005**
The only non-metal which is Liquid at ordinary temperature is:– **Br_2**	**UPTU/UPSEE-2005**
Transport number of Cl^- is least in– **HC*l***	**UPTU/UPSEE-2012**
The correct order of acidity of the following hydra acids is– **HF < HC*l* < HBr < HI**	**WB-JEE-30.04.2022**
The boiling points of HF, HCI, HBr and HI follow the order– **HF > HI > HBr > HCI**	**WB-JEE-2016**
At room temperature, the reaction between water and fluorine produces– **F^-,O_2 and H^+**	**WB-JEE-2018**

Search on TG: @apna_pdf

Cl_2O_7 is the anhydride of–	**$HClO_4$**	**WB-JEE-2018**
The reactive species in chlorine bleach is–	**OCl^-**	**WB-JEE-2019**
CS_2 layer gives a test for–	**Br^- and I^-**	**UP CPMT-2011**
Radon is–	**an inert gas**	**NDA (I)-2017**
Polar stratospheric clouds facilitate the formation of:–	**HOCl**	**JEE Main-26.06.2022, Shift-I**
HIO_3 On heating at 170°C give:–	**I_2O_5**	**CG PET-22.05.2022**
The inert gases producing maximum number of compounds are–	**Ar and Xe**	**MPPET-2008**
Helium is used in diving apparatus because–	**It is insoluble in blood at high pressure**	**SCRA - 2009**
Two compounds X and Y can react with XeF_6 to form cationic and anionic species respectively X and Y can be _____–	**BF_3, NaF**	**AP EAPCET-6 Sep. 2021, Shift-II**
Noble gases is used in miner's cap lamps–	**Krypton**	**AP EAMCET (Engg.) -2007**
Xenon best reacts with_____–	**Most electronegative elements**	**AP EAPCET 20.08.2021 Shift-II**
The molecule XeO_4 is–	**square planar**	**KARNATAKA NEET 2013**
Shape of O_2F_2 is similar to that of–	**H_2O_2**	**COMEDK 2018**
The noble gas used in atomic reactors is–	Helium	**AP-EAMCET (Medical), 2003**
In Fischer-Ringe method of separation of noble gases mixture from air, ...is used.–	**90% CaC_2+10%$CaCl_2$**	**AP EAMCET- 2005**
The geometries of XeF_4 and $XeOF_4$ respectively are _____–	**Square planar and square pyramidal**	**AP EAPCET 23-08-2021 Shift-I**
The structures of XeF_2 and XeF_4 respectively are_____.–	**Linear and Square planar**	**AP-EAMCET 25-08-2021 Shift - I**
The reason for not storing XeF_6 in a glass or a quartz vessel is that–	**It forms an explosive having the formula $XeOF_4$**	**[AIIMS-2011]**
Total number of lone pair of electrons in $XeOF_4$ is–	**1**	**[AIIMS-2011]**
In XeF_2, XeF_4, XeF_6 the number of lone pairs on Xe are respectively–	**3, 2, 1**	**AIEEE-2002**
XeF_4 disproportionate in water to give–	**Xe and XeO_3**	**VITEEE-2016**
Liquid Xe is used in bubble chamber to detect neutral mesons and gamma photons. Then, X is–	**Xe**	**AP-EAMCET (Engg.) 2013**
In the separation of noble gas mixture from air by Ramsay-Rayleigh's first method, the substances used for the removal of N_2 and O_2 respectively are–	**Mg and Cu**	**AP - EAMCET (Medical) - 2007**
The ease of loss of electron from Ne and Na^+ ion (both isoelectronic) are–	**2081 kJ mol^{-1}, 4562 kJ mol^{-1}**	**SRMJEEE – 2008**
Hydrolysis of XeF_4 and XeF_6 with water gives–	**XeO_3**	**AMU-2011**
The first noble gas compound was discovered by–	**Neil Bartlett**	**AMU – 2010 Manipal-2017**
The most abundant inert gas in the atmosphere is–	**Ar**	**Assam CEE-2014**
The gas not absorbed by coconut charcoal is–	**He**	**BCECE-2007**
Ionisation potential for a noble gas is:–	**maximum in a period**	**BCECE-2006**
Gradual addition of electronic shells in the noble gases causes a decrease in their–	**Ionization energy**	**[BITSAT-2006]**
Atomic radii of fluorine and neon in Angstrom units are respectively given by–	**0.72; 1.60**	**[BITSAT-2006]**
In the clathrates of xenon with water, the nature of bonding between xenon and water molecule is–	**dipole-induce dipole interaction**	**[BITSAT-2019]**

TEAM SNV

Search on TG: @apna_pdf

@apna_pdf

Noble gases are absorbed by– **activated coconut charcoal**	**[AIIMS-2010]**
Inert gases are mixed in iodine vapours. Then there are ____ between them– **Van der Waal's forces**	**[AIIMS-2007]**
XeF_6 on complete hydrolysis gives– **XeO_3**	**CG PET -2019 J & K CET-(2004) CG PET -2006**
Noble gases are used in discharge tubes to give different colours. Reddish-orange glow is due to– **Ne**	**JCECE - 2007, JIPMER-2008**
In Fischer-Ringe's method of separation of nobles gas mixture from air, ... is used– **90% CaC_2+10%$CaCl_2$**	**JIPMER-2014**
The correct order of solubility in water for He, Ne, Ar, Kr, Xe is– **Xe > Kr > Ar > Ne > He**	**[AIIMS-2002]**
Xenon hexafluoride reacts with silica to form a xenon compound X. The oxidation state of xenon in X is– **+6**	**JIPMER-2018**
XeF_6 on hydrolysis produces– **XeO_3**	**[AIIMS-2007]**
In Ramsay and Rayleigh's isolation of noble gases from air, the nitrogen of the air is finally converted into– **$NaNO_2$ and $NaNO_3$**	**Karnataka-CET-2011**
Argon is used– **in high temperature welding**	**JIPMER-2011 KARNATAKA-CET, 2009**
The noble gas mixture is cooled in a coconut bulb at 173 K. The gases that are not adsorbed are:– **He and Ne**	**Karnataka-CET-2007**
Hydroxyl ion concentration of 10^{-2} M HCl is– **1×10^{-12} mol dm^{-3}**	**Karnataka-CET-2007**
Rare gases are sparingly soluble in water because of– **Dipole-induced dipole interaction**	**Kerala-CEE-2019**
Argon possesses– **translational motion only**	**MHT CET-2010**
Noble gases are named because of their inertness towards reactivity. Identify an incorrect statement about them.– **Noble gases have very high melting and boiling point**	**(NEET 2021)**
The number of peroxide bonds in perxenate ion $[XeO_6]^{4-}$ is– **0**	**UP CPMT-2014**
The noble gas used for treatment of cancer is– **radon**	**Manipal-2018 UP CPMT-2011**
Element having maximum electron– **chlorine**	**UP CPMT-2005**
Radioactive metal is– **Ra**	**UP CPMT-2005**
Number of electrons surrounding Kr in KrF_2 is– **10**	**UP CPMT-2005**
The lightest gas is– **He**	**UP CPMT-2002**
The oxidation states of iodine in HIO_4, H_3IO_5 and H_5IO_6 are respectively:– **+7, +7, +7**	**UPTU/UPSEE-2006**
Glass is a– **non-crystalline amorphous solid**	**NDA (I)-2017**
The Poisonous nature of Carbon monoxide (CO) is due to its– **ability to form a complex with haemoglobin**	**NDA (I)-2018**
SiO_2 is soluble in;– **HF**	**AP-EAMCET (Med.)-1999**
The process of slow cooling of glass is called– **Annealing**	**AP EAMCET- 1991**
The reagent that has action on glass is– **Hydrofluoric acid**	**AP EAMCET- 1991**
The melting point of diamond is very high since the type of bonding in it is– **Three dimensional giant network**	**AP EAMCET- 1993**
Glass is soluble in a solution of– **Hydrofluoric acid**	**AP EAMCET- 1993**
Ordinary glass is a combination of the following– **SiO_2, Na_2SiO_3, $CaSiO_3$**	**AP EAMCET- 1995**
The glass which contains PbO mainly is– **Flint glass**	**AP EAMCET- 1995**
The inert form of carbon is– **Diamond**	**AP EAMCET- 1995**

Search on TG: @apna_pdf

@apna_pdf

Silica is soluble in– **HF**	**AP EAMCET- 1998 Haryana PMT-2009**
Carbogen is– **Mixture of O_2 and CO_2**	**AP EAMCET- 1998**
During Serpeck's process, silica is eliminated as– **Si (vapour)**	**AP EAMCET- 2000**
Identify (P) and (Q) in the following reaction: $CH_3Cl + Si \xrightarrow[570\,K]{Cu-powder} (P) \xrightarrow{H_2O} (Q) \longrightarrow$ Straight chain polymer– **P: $(CH_3)_2SiCl_2$ Q: $(CH_3)_2Si(OH)_2$**	**AP EAPCET 19-08-2021 Shift-I**
The catenation tendency of C, Si and Ge is in the order Ge < Si < C. The bond energies (in kJ mol^{-1}) of C–C, Si–Si and Ge–Ge bonds, respectively are– **348, 180, 167**	**AP EAMCET (Engg.) 2001**
The acidic character of the group-15 elements in the increasing order is _____– **$Bi_2O_3 < Sb_2O_3 < As_2O_3 < P_2O_3$**	**AP EAPCET 24.08.2021, Shift-I**
Identify the incorrect statement about SiO_2 (silica) from the following:– **It is highly reactive due to low Si – O bond enthalpy**	**AP EAPCET 24.08.2021, Shift-I**
The element with maximum bond-energy_____.– **C**	**AP EAPCET 20.08.2021 Shift-II**
$H_2S_2O_7$ has a commercial name as– **oleum**	**COMEDK-2019**
Carbogen is– **mixture of O_2 and CO_2**	**COMEDK 2019**
The chemical formula of zeolite is:– **$Na_2Al_2Si_2O_8.xH_2O$**	**AP-EAMCET (Medical), 2003**
Hydrolysis of $SiCl_4$ gives compound X and HCl. On heating to 1000°C, X loses water and forms Y. Indentify X and Y, respectively– **H_4SiO_4 and SiO_2**	**AP-EAMCET (Medical), 2008**
The 'dry ice' is .....– **solid CO_2**	**AP EAMCET (Engg.) 18.09.2020, Shift-I**
Silicon is an important constituent of– **rocks**	**AIIMS-1996**
Name the kind of silicate formed, when two silicate units $(SiO_4)^{4-}$ share one oxygen atom.– **Pyrosilicate**	**AP EAMCET (Engg.) 17.09.2020, Shift-II**
The compound that do not react with dilute HCl at high temperature– **$PbSO_4$**	**(AIIMS-27 May, 2018-Morning)**
Ge(II) compounds are powerful reducing agents whereas Pb(IV) compounds are strong oxidants. It can be due to– **More pronounced inert pair effect in lead than in Ge**	**(AIIMS-2012)**
Carborundum is obtained when silica is heated at high temperature with– **carbon**	**(AIIMS-2014)**
The chemical formula of" tear gas" is– **CCl_3NO_2**	**(AIIMS-2008)**
The energy gaps (E_g) between valence band and conduction band, for diamond, silicon and germanium are in the order:– **E_g (diamond) > E_g (silicon) > E_g (germanium)**	**(AIIMS-2006)**
The repeating unit in silicone is– **R_2SiO**	**(AIIMS-2007)**
The liquefied metal expanding on solidification is:– **Ga**	**(AIIMS-2004)**
The electrical conductivity of semiconductors:– **increases with temperature**	**(AIIMS-2001)**
Producer gas is a mixture of:– **CO + N_2**	**(AIIMS-1998, 2000)**
Solid CO_2 is known as dry ice:– **It evaporates at – 78°C without melting**	**(AIIMS-2000)**
Water glass is:– **Na_2SiO_3**	**(AIIMS-2001) BCECE-2007**
Water gas is produced by:– **Passing steam over red hot coke**	**(AIIMS-2001)**
Bell metal is an alloy of:– **Sn and Cu**	**(AIIMS-1999)**
The approximate percentage of silica in cement is:– **20 - 25%**	**(AIIMS-1998)**
$SiCl_4$ on hydrolysis forms 'X' and HCl. Compound 'X' loses water at 1000°C and	**VITEEE- 2009**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

gives 'Y'. Compounds 'X' and 'Y' respectively are– **H_4SiO_4, SiO_2**	
Chemically zeolites are _____– **Hydrates aluminosilicates**	**AP- EAPCET- 07-09-2021, Shift-I**
Silica (SiO_2) reacts with Mg to form a magnesium compound X. X reacts with dilute HCl and forms Y. Y is :– **$MgCl_2$**	**AP-EAMCET (Engg.)-2004**
$SiCl_4 \xrightarrow{H_2O} X \xrightarrow{1000°C} Y$ In the above reaction, X and Y respectively are– **H_4SiO_4 and SiO_2**	**AP - EAMCET (Medical) - 2007**
Silica is attacked by– **hydrofluoric acid**	**AMU-2013**
Carbon can reduce ferric oxide to iron at a temperature above 983K because– **carbon has a higher affinity towards oxidation than iron**	**BCECE-2014**
Ordinary glass is:– **Sodium and calcium silicate**	**BITSAT-2015**
Doping of silicon with boron leads to– **p- type semiconductor**	**CG PET- 2011**
Number of carbon atoms in kerosene is– **C_{12-16}**	**Manipal-2020, CG PET-2015 UPTU/UPSEE-2005**
The one that is extensively used as a piezoelectric material is– **quartz**	**(JEE Main 2019, 9 Jan Shift-I)**
The element that shows greater ability to form pπ - pπ multiple– **C**	**(JEE Main 2019, 12 Jan Shift-II)**
The stability of dihalides of Si, Ge, Sn and Pb increases steadily in the sequence– **$SiX_2 < GeX_2 < SnX_2 < PbX_2$**	**(AIEEE 2007)**
In silicon dioxide– **Each silicon atom is surrounded by four oxygen atoms and each oxygen atom is bonded to two silicon atoms**	**(AIEEE 2005)**
Glass is a– **Super cooled liquid**	**(AIEEE 2003)**
The amorphous form of silica is– **Kieselguhr**	**(JEE Main 2019, 9 April Shift-II)**
An oxide of an element is a gas and dissolves in water to give an acidic solution. The element belongs to– **IV group**	**AP EAMCET- 2007**
Carbon and germanium belong to the 14^{th} group. The maximum co-ordination number of carbon is less than germanium, because of _____– **Availability of low-lying d-orbitals in germanium**	**AP EAPCET 23-08-2021 Shift-I**

Important compound of boron and used of boron and aluminum and their compound

The process of converting hydrated alumina $Al(OH)_3$ into anhydrous alumina is called– **Calcination**	**CG PET-22.05.2022**
The Chemical formula of feldspar is– **$KAlSi_3O_8$**	**AP EAMCET-2007**
Diethyl ether is prepared by passing ethyl alcohol vapours over a catalyst under high pressure and temperature. The catalyst is– **Al_2O_3**	**A.P.EAMCET/1996**
Electrolytic reduction of Al_2O_3 to Al generally faces the difficulties like bad conductivity of Al_2O_3 and high fusion temperature. These difficulties are overcome by the addition of– **Cryolite and CaF_2 to alumina**	**SCRA-2010**
Boron compounds behave as Lewi's acid because of their_____.– **Electron deficient in nature**	**AP EAMCET- 2008 AP-EAMCET 25-08-2021 Shift - I**
The metal that forms a self protecting film of oxide to prevent corrosion, is– **Al**	**EAMCET-1994**
BF_3 is used as a catalyst in several industrial processes due to its– **Strong Lewis acid nature**	**AP EAMCET (Engg.) 17.09.2020 Shift-I**
In borax bead test borax produces– **Metal metaborate**	**SCRA - 2009**
The possible oxidation states of group 13 elements is/are– **+1, +3**	**AP EAMCET (Engg.)**

Search on TG: @apna_pdf

@apna_pdf

	21.09.2020, Shift-II
The bonding in diborane (B_2H_6) can be described by– **4 two centre-two electron bonds and 2 three-centre-two electron bonds**	**TS EAMCET-2017**
Aluminium (III) chloride forms a dimer because aluminium _____– **Can have higher co-ordination number**	**AP EAPCET 24.08.2021 Shift-II**
AlF_3 is soluble in HF only in the presence of KF due to formation of— $[AlF_6]^{3-}$	**AP EAPCET 20.08.2021 Shift-I**
The stability of +1 oxidation state increases in the sequence _____– **Al < Ga < In < Tl**	**AP EAPCET 24.08.2021, Shift-I**
H_3BO_3 or B $(OH)_3$ is considered as an acid because its molecule_____– **Accepts OH^- from water, releasing a proton**	**AP EAPCET 20.08.2021 Shift-II**
What is Z in the following reactions? $BCl_3 + H_2 \xrightarrow[450^oC]{Cu\text{-}Al} X + HCl$ $X \xrightarrow{\text{methylation}} Z$ – $(CH_3)_4 B_2H_2$	**AP EAMCET (Engg.) 2012**
Zeolites are shape selective structures because of– **Honey comb like structure**	**COMEDK-2015,2014**
Aluminium reacts with concentrated HCℓ and concentrated NaOH to liberate the gases ..... respectively:– **H_2 and H_2**	**AP-EAMCET (Medical), 2001**
Number of water molecules in Mohr's salt is– **6**	**AIIMS-1994**
Thermite is a mixture of iron oxide and– **aluminium powder**	**AIIMS-2002**
A neutral molecule XF_3 has zero dipole moment. The element X is most likely– **boron**	**(AIIMS-2016)**
The correct formula of borax is– **$Na_2[B_4O_5(OH)_4].8H_2O$**	**(AIIMS-2016)**
Chemically borax is– **Sodium tetraborate decahydrate**	**(AIIMS-2015)**
BCl_3 does not exists as dimer but BH_3 exists as dimer (B_2H_6) because– **large sized chlorine atoms do not fit in between the small boron atoms where as small sized hydrogen atoms get fitted in between boron atoms**	**(AIIMS-2012)**
Borax is used as cleansing agent because on dissolving in water it gives– **alkaline solution**	**(AIIMS-2006)**
In diborane, the two H-B-H angles are nearly:– **95^0, 120^0**	**(AIIMS-2005)**
In lake test of Al^{3+} ion, there is a formation of colored floating. It is due to:– **adsorption of litmus by $Al(OH)_3$**	**(AIIMS-2001)**
Al_2O_3 on heating with carbon in an atmosphere of N_2 at high temperature produces:– **AlN + CO**	**(AIIMS-1999)**
The most abundant metal in the earth crust is:– **Al**	**(AIIMS-1998)**
What are X and Y respectively in the following reaction? $B_2H_6 + 2KOH + 2X \rightarrow 2Y + 6H_2$ – **H_2, KBO_2**	**AP-EAMCET (Engg.)-2004**
Aluminium metal becomes passive in– **conc. HNO_3**	**AP- EAMCET(Medical) - 2010**
Diborane reacts with HCl in the presence of $AlCl_3$ and liberates– **H_2**	**AP-EAMCET (Engg.) 2013**
Except B and Al, all other III group element exhibit + 1 oxidation state. This is because– **due to inert pair effect**	**AP - EAMCET (Medical) - 2007**
In cigarette lighters ___ is used.– **pyrophoric alloy**	**SRMJEEE – 2010**
The intermediate product (X) formed in the following reaction is $B_2H_6 + 6NH_3 \rightarrow 3X \xrightarrow{heat} 2B_3N_3H_6 + 12H_2$ – **$[BH_2(NH_3)_2]^+ [BH_4]^-$**	**AMU-2018**
DIBAL-H is– **AlH(i-Bu)$_2$**	**AMU-2015**
Value of x in potash alum, $K_2SO_4 . Al_x(SO_4)_3 . 24H_2O$ is– **2**	**BCECE-2008**
Boric acid is polymeric due to– **The presence of hydrogen bonds**	**BCECE-2012**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

What is Z in the following reactions? $BCl_3 + H_2 \xrightarrow[450^0C]{\text{Cu-Al}} X + HCl$ $X \xrightarrow{\text{methylation}} Z$ – **$(CH_3)_4B_2H_2$**	**BCECE-2014**
The stability of the +1 oxidation state in Group 13 elements increases in the sequence– **A*l* < Ga < In < T*l***	**JEE Main-2019, 11 Jan Shift-II** **BITSAT-2019** **AMU–2006** **NEET-2015, 2009**
Diborane (B_2H_6) reacts independently with O_2 and H_2O to produce, respectively;– **B_2O_3 and H_3BO_3**	**BITSAT-2021**
Formula of diaspore is– **$Al_2O_3\ H_2O$**	**CG PET -2019**
Aluminium is extracted by the electrolysis of– **alumina mixed with molten cryolite**	**CG PET- 2013**
Cryolite is used in the electrolytic extraction of aluminium–**to decompose bauxite**	**CG PET -2007**
The metal that does not give the borax bead test is– **Lead**	**CG PET -2005**
Corundum is– **Al_2O_3**	**CG PET -2018**
If we mix a pentavalent impurity in a crystal lattice of Ge, what type of semiconductor formation will occur?– **n- type**	**CG PET- 2010**
Zeiglar Natta catalyst is a mixture of _____.– **$(C_2H_5)_3$ A*l* & TiCl_4**	**GUJCET-2020**
The type of hybridisation of boron in diborane is– **sp^3 hybridisation**	**(AIEEE 2007), NEET-1999** **AP EAMCET- 1992**
The structure of diborane (B_2H_6) contains– **four 2c–2e$^-$ bonds and two 3c – 2e$^-$ bonds**	**AMU-2011,** **UPTU/UPSEE-2007** **(AIEEE 2005)**
Heating of an aqueous solution of aluminium chloride to dryness will give– **Al_2O_3**	**(AIEEE 2005)**
Aluminium chloride exists as dimer, Al_2Cl_6 in solid state as well as in solution of non-polar solvents such as benzene. When dissolved in water, it gives– **$[Al(H_2O)_6]^{3+} + 3Cl^-$**	**(AIEEE 2004)**
Alum is widely used to purify water since– **it coagulates the mud particles**	**(AIEEE 2002)**
Aluminium is usually found in +3 oxidation state. In contrast, thallium exists in +1 and +3 oxidation states. This is due to– **inert pair effect**	**(JEE Main 2019, 9 Jan Shift-I)**
The electronegativity of aluminium is similar to– **beryllium**	**(JEE Main 2019, 10 Jan Shift-I)**
The number of 2-centre-2-electron and 3-centre -2-electron bonds in B_2H_6, respectively, are– **4 and 2**	**(JEE Main 2019, 10 Jan Shift-II)**
The most stable oxidation state exhibited by Thallium is– **+1**	**J & K CET-(2012)**
Boron is unable to form BF_6^{3-} because of– **Lack of d-orbital's in boron**	**J & K CET-(2012)**
Boron resembles carbon and silicon in many respects. However, one of the main differences of boron with carbon is that it– **form compounds which often behave as Lewis acids**	**J & K CET-(1997)**
The +1 oxidation state of thallium is more stable than its +3 oxidation state because of– **Inert pair effect**	**J & K CET-(2013)**
Inorganic benzene is– **$B_3H_6N_3$**	**Assam CEE-2020** **AMU-2016, JCECE - 2010** **UP CPMT-2010,** **JIPMER-2010** **AP EAMCET-1999**
Arsenic sulphide is a negative sol. The reagent with least precipitating power is– **Glucose**	**JCECE - 2011**

Search on TG: @apna_pdf

@apna_pdf

Gallium arsenide is purified by– **Zone refining method**	**JCECE - 2011**
When ortho boric acid (H_3BO_3) is heated, the residue is– **Boric anhydride**	**JCECE - 2015**
The process of converting hydrated alumina into anhydrous alumina is called– **Calcination**	**JCECE - 2016**
H_3BO_3 is a– **Monobasic and Lewis acid**	**JCECE - 2016**
In III group precipitation, NH_4CI is added before adding NH_4OH to– **Decrease conc. of OH^- ion**	**JIPMER-2009**
The complex formed when Al_2O_3 is leached from bauxite using conc. NaOH solution is,– **$Na[Al(OH)_4]$**	**Karnataka-CET-2016**
Boric acid is used in carom boards for smooth gliding of pawns because.– **H_3BO_3 molecules are loosely chemically bonded and hence soft**	**Kerala-CEE-2006**
Each B–H–B bridge in B_2H_6 is formed by the sharing of:– **2 electrons**	**Kerala-CEE-2004**
The correct formula of borax is– **$Na_2[B_4O_5(OH)_4].8H_2O$**	**Kerala-CEE-2013**
The diagonal relationship in Be and Al is due to– **Similar ionic size and charge/radius ratio**	**MHT CET-03.05.2019, SHIFT-I**
BF_3 is planar and electron deficient compound. Hybridization and number of electrons around the central atom, respectively are– **sp^2 and 6**	**NEET-2021**
The correct order of atomic radii in group 13 element is– **B < Ga < Al < In < Tl**	**NEET-2018**
AlF_3 is soluble in HF only in presence of KI. It is the to the formation of– **$K_3[AlF_6]$**	**NEET-II 2016**
Aluminium (III) chloride forms a dimer because aluminium– **Can have higher coordination number**	**NEET-1995**
The tendency of BF_3, BCl_3 and BBr_3 to behave as Lewis acid decreases in the sequence– **$BBr_3 > BCl_3 > BF_3$**	**NEET-2010**
The relative Lewis acid character of boron trihalides is in the order– **$BI_3 > BBr_3 > BCl_3 > BF_3$**	**AMU-2019 JCECE-2015 J & K CET-2012 AMU-2005 Kerala CEE-2005**
Boric acid is an acid because its molecule– **Accepts OH^- from water releasing proton**	**NEET-II 2016 UP CPMT-2012**
Zeolite which is used for softening of hard water is– **hydrated sodium aluminium silicate**	**AMU–2003**
Ammonal used in bombs is a mixture of– **Al + $Al(NO_3)_3$**	**UP CPMT-2011**
The process of converting hydrated alumina into anhydrous alumina is called– **Calcination**	**UP CPMT-2009**
In solid CO_2, small molecules are held together by– **Vander Waal's forces**	**AMU–2003**
Electron deficient molecule is– **BF_3**	**UP CPMT-2005**
Fusion of boron with NaOH produces– **$Na_3BO_3 + H_2$**	**UP CPMT-2001**
When borax is heated strongly, it gives– **B_2O_3**	**UPTU/UPSEE-2010**
The magnetic nature of boron molecule is same as the magnetic nature of– **unipositive nitrogen molecule**	**UPTU/UPSEE-2010**
$B(OH)_3$ is a– **Monobasic acid**	**Assam CEE-2014**
In borax the number of B —O—B links and B—OH bonds present are, respectively– **five and four**	**WB-JEE-2013**
In diborane, the number of electrons that accounts for bonding in the bridges is– **four**	**WB-JEE-2013**
The reducing power of Al, Ga, In and Tl follows the sequence– **Tl > In > Ga > Al**	**AMU-2007**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

Allotropes of Carbon	
'X' melts at low temperature and is a bad conductor of electricity in both liquid and solid state. X is– **carbon tetrachloride**	**(JEE Main 2020, 9 Jan Shift-II)**
The difference in activity $Me_3CCH_2COOH > Me_3SiCH_2COOH$ Can be attributed to the fact that– **Silicon is more electropositive than carbon and therefore has an electron donating inductive effect**	**J & K CET-(2001)**
The electronic configuration of chalcogens is– **$ns^2\ np^4$**	**J & K CET-(2000)**
The catenation tendency of C, Si and Ge is in the order Ge < Si < C. The bond energies [in kJ mol^{-1}]of C–C, Si–Si and Ge–Ge bonds, respectively are– **348, 180, 167**	**JIPMER-2015**
The energy gap is much more in silicon than in germanium because– **It valence electrons are more tightly bound to their parent nuclii**	**Kerala-CEE-2019**
The number of six membered and five membered rings in Buckminster Fullerene respectively is– **20, 12**	**Kerala-CEE-29.08.2021 Karnataka CET-2021**
More than four bonds are made by how many elements in carbon family?– **5**	**Kerala-CEE-2018**
What is the hybridisation of carbon atoms in fullerene– **sp^2**	**JIPMER-2018, MHT CET-2017**
The common basic structural unit in silicates and silica is– **SiO_4^{4-}**	**MHT CET-2011**
The central carbon atom of a free radical contains– **7 electrons**	**MHT CET-2011**
Monosilane on coming in contact with air burns with a luminous flame producing vortex rings. These rings are of– **SiO_2**	**MHT CET-2007**
The basic structural unit of silicates is– **SiO_4^{4-}**	**NEET-2013**
The Straight chain polymer is formed by– **hydrolysis of $(CH_3)_2SiCl_2$ followed by condensation polymerisation**	**NEET-2009**
Name the type of the structure of silicate in which one oxygen atom of $[SiO_4]^{4-}$ is shared?– **Pyrosilicate**	**JIPMER-2014, NEET-2011**
It is because of inability of ns^2 electrons of the valence shell to participate in bonding that– **Sn^{2+} is reducing while Pb^{4+} is oxidising**	**NEET-2017**
A nuclide of an alkaline earth metal undergoes radioactive decay by emission of three α particles in succession. The group of the resulting daughter element would belong to– **Group 14**	**JIPMER-2007**
Some important compound of carbon and silicon	
Carbon and silicon belong to (IV) group. The maximum coordination number of carbon in commonly occurring compounds is 4, whereas that of silicon is 6. This is due to– **availability of low lying d-orbital's in silicon**	**NEET-1994**
The element Z = 114 has been discovered recently. It will belong to which of the following family/group and electronic configuration?– **Carbon family, [Rn] $5f^{14}\ 6d^{10}\ 7s^2\ 7p^2$**	**NEET-2017**
Carbon atom consists of electrons, protons and neutrons. If the mass attributed to neutron were halved and that attributed to the electron were doubled, the atomic mass of $_6C^{12}$ would be approximately– **reduced by 25%**	**UP CPMT-2013**
Ge (II) compounds are powerful reducing agents where as Pb (IV) compounds are strong oxidants. It can be due to– **more pronounced inert pair effect in lead than Ge**	**UP CPMT-2011**
Darking of surfaces painted with white lead is due to– **H_2S**	**UP CPMT-2009**
Ordinary glass is formed by mixing of– **$Na_2CO_3 + CaCO_3 +$ silica**	**UP CPMT-2009**
SiO_2 is reacted with sodium carbonate. What is the gas liberated?– **CO_2**	**UP CPMT-2008**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

White lead is– **$2PbCO_3Pb(OH)_2$**	**UPTU/UPSEE-2008 UP CPMT-2007**
The oxidation number of carbon in CH_2O is– **0**	**UP CPMT-2004**
The purest form of coal is– **Anthracite**	**UP CPMT-2003**
Sindoor is represented by– **Pb_3O_4**	**UP CPMT-2002**
Reducing power of Ge^{+2}, Sn^{+2} and Pb^{2+} decrease in the order– **$Ge^{+2} > Sn^{+2} > Pb^{+2}$**	**UP CPMT-2001**
When an iron object is plated with tin, tin does not act as sacrificial anode in protecting against corrosion, because– **tin is less reactive than iron**	**JIPMER-2016**
Pb reacts with dilute HNO_3 produces:– **NO**	**UPTU/UPSEE-2006**
The elements commonly used for making transistors are:– **Si and Ge**	**UPTU/UPSEE-2006**
Red lead is– **Pb_3O_4**	**UPTU/UPSEE-2015**
Silicon doped with gallium forms– **p-type semiconductor**	**Karnataka-CET-2020**
Silicon oil is obtained from the hydrolysis and polymerisation of– **trimethylchlorosilane and dimethyldichlorosilane**	**WB-JEE-2013**
The main reason that $SiCl_4$ is easily hydrolysed as compared to CCl_4 is that– **Si can extend its coordination number beyond four**	**WB-JEE-2018**
Fullerene with formula C_{60} has a structure where every carbon atom is– **sp^2-hybridized**	**COMEDK-2014**
Thermodynamically, the most stable form of carbon is– **Graphite**	**(AIIMS-2009) Manipal -2016 CGPET-2017**
In diamond crystal, each carbon atom is linked with carbon atoms. The number of carbon atoms linked is:– **4**	**(AIIMS-2001)**
Buckminster- fullerene is a variety of– **carbon**	**CG PET -2009**
The order of acidic strength is– **$HClO_4 > HClO_3 > HClO_2 > HClO$**	**GUJCET-2019**
The number of pentagons in C_{60} and trigons (triangles) in white phosphorus, respectively, are– **12 and 4**	**(JEE Main-2019, 10 April Shift-II)**
C_{60} an allotrope of carbon contains– **20 hexagons and 12 pentagons**	**(JEE Main-2019, 9 April Shift-I) Assam CEE -2019**
The hardest substance is– **Diamond**	**JIPMER-2005**
Graphite is soft while diamond is hard because– **graphite is in planar form while diamond is in tetrahedral form**	**JIPMER-2005**
Hybridised states of carbon in graphite and diamond are respectively– **sp^2, sp^3**	**Karnataka-CET-2013**
Graphite is a soft solid lubricant extremely difficult to melt. The reason for this anomalous behavior in the graphite.– **has carbon atoms arranged in large plates of rings of strongly bond carbon atoms with weak interplate bonds**	**Karnataka-CET-2007 UPTU/UPSEE-2007, AIEEE–2003**
The number of six membered and five membered rings in Buckminster Fullerene respectively is– **20, 12**	**Kerala-CEE-29.08.2021 Karnataka-CET-2021**
Percentage of lead in lead pencil is– **zero**	**NEET-1999**
In graphite, electrons are– **spread out between the structure**	**NEET-1997, 1993**
Graphite is a good conductor of electricity. Its electrical conductivity is due to the fact that– **In it C atoms are sp^2 hybridized**	**UP CPMT-2010**
Inorganic graphite is– **BN**	**UP CPMT-2005**
Buckminster fullerene is:– **C-60**	**UPTU/UPSEE-2006**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

16. d- and f- Block Element

Electronic configurations & Characteristics of d- block Elecments

- The transition metals ions is colourless in aqueous solution– **Ti^{4+}**
- The d-block element is a – **Zn**
- The maximum unpaired d-electrons is – **Fe^{2+}**
- The spin only magnetic moment of Fe^{3+} ion (in BM) is approximately– **6**
- The highest oxidation state exhibited by transition metals is– **+8**
- The magnetic moment μ, of transition metals is related to the number of unpaired electron, n as– **$\mu = \sqrt{n(n+2)}$**
- Transition metal show paramagnetic behaviour This is because of their– **Unpaired electrons**
- The pairs of ions have the same electronic configuration is – **Fe^{3+}, Mn^{2+}**
- The magnetic moment of a divalent ion in aqueous solution with atomic number 25 is– **5.9 BM**
- The order of number of unpaired electron is– **Fe^{3+} > Cr^{3+} > Ni^{2+} > Cu^{2+}**
- The pairs, metals have same number of unpaired electrons– **Sc, Cu**
- The variable oxidation state are exhibited by the elements of 3d-series because– **Energy difference between 3d and 4s orbitals is small**
- Only one oxidation state is possible with– **Zn**
- The oxidation state of +1 is possible with– **Cu and Cr**
- The first is more stable than the second as– **Fe^{3+}, Fe^{2+}**
- The magnetic moment of Ni^{2+} ion (atomic number of Ni = 28) in BM unit is– **2.84**
- The transition metal is not coloured is – **Cu^{+}**
- The ion of least magnetic moment is– **Ti^{3+}**
- The pairs of elements cannot form an alloy is – **Fe, Hg**
- Essential component of amalgam is– **Hg**
- The pairs magnetic moment is same as – **$CuCl_2$, $TiCl_3$**
- The stability of ferric ion is due to– **Half-filled d-orbitals**
- The compounds is not coloured as – **$Na_2[CdCl_4]$**
- The amphoteric ion is not an– **Fe^{3+}**
- The d-block elements have same configuration of (n-1) d subshell is – **Cu, Zn**
- The correct order of decreasing second ionization enthalpy of Ti (22), V(23), Cr(24) and Mn(25) is– **Cr > Mn > V > Ti**
- The maximum number of unpaired electrons are present in– **Fe^{3+}**
- The most stable ion is– **Mn^{2+}**
- The compounds is expected to be coloured– **$TiCl_3$**
- In the reaction, $Cu \rightarrow Cu^{+} + e^{-}$, the electron is lost from the subshell– **4s**
- The ion, Cu^{+} is isoelectronic with– **Zn^{2+}**
- The species will impart colour in its aqueous solution– **Cr^{3+}**
- The paris, both elements exhibit same highest oxidation state– **Ti, Ni**
- The ions is coloured in its aqueous solution– **V^{3+}**
- The highest number of unpaired electrons– **Mn^{2+}**
- The elements of 3d-series will give coloured compounds of its ions containing– **Vacant 3d-orbitals** **Unpaired electrons in 3d**
- The pairs of ions, both are colorless– **Ti^{4+}, Cu^{+}**
- The lightest transition element is– **Sc**
- The d-block elements include– **Only metals**
- The actual configurationof Cr is– **[Ar] $3d^5$ $4s^1$**
- Transition metal with low oxidation number will act as– **An acid**
- The pair will have effective magnetic moment equal– **Cr^{+2} and Fe^{+2}**
- The number of d-electrons in Fe^{3+} (at no. of Fe = 26) is not equal to that of the– **p - electrons in Cl^{-} (at. no. of Cl = 17)**
- The order of magnetic moments (spin only values in B.M.) among is– **$[MnCl_4]^{2-} > [CoCl_4]^{2-} > [Fe(CN)_6]^{4-}$**

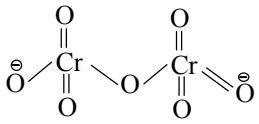
Search on TG: @apna_pdf

@apna_pdf

- The magnetic moment of $[FeF_6]^{3-}$- **5.92**
- The diamagnetic character is – **$[Ni(CN_4)]^{2-}$**
- The metal is used to make alloy steel for armour plates, safes and helmets- **Mn**
- Solder is an alloy of– **33% lead, 67% tin**
- The stable electronic configuration of Fe^{+3} ion– **$3d^5\ 4s^0$**
- The elements does not belong to the first transition series (3d series)– **Pd**
- In the first transition series, the highest boiling and melting point is of– **Cr**
- The correct order of the elemetns with respect to their density is– **Zn < Cr < Fe < Co < Cu**
- Electronic configuration of Cr and Cu respectively are– **[Ar] $3d^5\ 4s^1$, [Ar] $3d^{10}\ 4s^1$**
- The number of oxidation states of manganese is– **6**
- The number of unpaired electrons in cobalt atom is (atomic number of Co = 27)– **3**
- The charge on Fe^{x+} if the magnetic moment is $\sqrt{24}$ – **+2**
- Mn show oxidation state from +2 to +7. The most oxidizing state known in queous solution is– **+7**
- The number of unpaired electrons present in Cr^+ would be– **5**
- The ions Zn^{2+}, Ni^{2+} and Cr^{3+} [atomic number of Zn = 30, Ni = 28, Cr = 24]– **Only Zn^{2+}, is colourless and Ni^{2+} and Cr^{3+} are coloured**
- Zinc and mercury do not show variable valency like d-block elements because – **Their d-shells are complete**
- On applying magnetic field, the paramagnetic substances get– **Attracted**
- Ti^{3+} transition metal ion is purple in colour while Ti^{4+} metal ion is colourless due to– **No unpaired electrons in d-orbitals**
- Potassium permanganate acts as an oxidant in neutral, alkaline as well as acidic media. The final products obtained from it in the three conditions are, respectively– **MnO_2, MnO_2, Mn^{2+}**
- The oxidation state of chromium is +6 in– **Potassium chromate, Potassium dichromate**
- The oxidation state of Mn in potassium manganate is– **+6**

Compounds of transition elements

- The structure of dichromate ion is –



- The ionic radii of chromium would be smallest– **K_2CrO_4**
- $KMnO_4$ in basic medium is reduced to– **MnO_2**
- A group of acidic oxide is– **CrO_3, Mn_2O_7**
- The yellow colored solution of Na_2CrO_4 changes to orange red on passing CO_2 gas due to the formation of– **$Na_2Cr_2O_7$**
- $CrO_4^{2-} \underset{pH=Y}{\overset{pH=X}{\rightleftharpoons}} Cr_2O_7^{2-}$

  The value of X and Y respectively are– **4, 8**
- The oxidation number of Mn in $KMnO_4$?– **7**
- In acidic solution, oxidising action of potassium dichromate can be represented as– **$Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$**
- The manganate ion is– **Paramagnetic**

Lanthanoids and Actinoids

- The common oxidation state shown by lanthanides in their compounds is– **+3**
- Zr and Hf have almost equal atomic and ionic radii because of– **Lanthanoid contracftion**
- The configuration of f-block elements is– **$(n-2)\ f^{1-14}(n-1)\ d^{0-1}\ ns^2$**
- In lanthanoids, the last electron enters (n–2)f subshell where n is equal to– **6**
- The number of unpaired electrons present, as per accepted electronic configuration in Yb (70) is/are– **0**
- The total number of unpaired electrons present in an atom of Gd (64), are– **8**
- Gd (64) gives an oxidation state of only +3 because– **In +3 oxidation stae, it has stable configuration**
- The non-lanthanide element– **La**
- The atomic number of 4f-series range from– **58 to 71**
- The ion is paramagnetic an– **Sm^{3+}(Z = 62)**
- The total number of inner transition elements in the periodic table - **28**
- The electronic configuration of cerium is– **$[Xe]4\ f^1\ 5d^1 6s^2$**
- The most stable oxidation state of actinoids– **+3**
- The actinide is not an– **Terbium**
- Cerium (Z = 58) is an important member of the lanthanoids. **The +4 oxidation state of cerium is not known in solutions**
- The electronic configuration of Thorium is– **$[Rn]\ 6d^5\ 7s^2$**

TEAM SKY

Search on TG: @apna_pdf

@apna_pdf

Some Applications of d-and f-Block Elements

- The oxidation of ethyne to ethanal is catalysed by in the Wacker process is – **$PdCl_2$**
- The compounds is used in the pigment industry is– **TiO**
- The given compound is used in dry battery cells as – **MnO_2**
- Maximum oxidation state is shown by– **Os**
- In the dichromate dianion– **6 Cr-O bonds are equivalent**
- The stability of a particular oxidation state of a metal in aqueous solutions is determined by– **Enthalpy of sublination, Ionisation enthalpy, Enthalpy of hydration**
- The factor that may be regarded as the main cause of Lanthanide contraction– **Poor shielding of one of the 4f-electrons by another in the sub-shell**
- The metals that react with chlorine to form their respective chlorides– **Cu, Ag, Au**
- Lanthanoid contraction occurs because– **The poor shielding effect of 4f electrons is coupled with increased attraction between the nucleus and the added electrons**
- The element with the electronic configuration $[Xe]4f^{14}5d^{1}6s^{2}$ is a– **Lanthanide element**
- The oxide of Mn that is acidic in nature– **Mn_2O_7**
- The Lanthanoids contraction is responsible for the fact that is– **Zr and Hf have about the same radius**
- The strongest base is a– **$La(OH)_3$**
- The oxides of chromium that is amphoteric in nature– **Cr_2O_3**
- The inner transition elements are the elements in the added electrons go to– **(n-2)f-orbitals**
- The ground state electronic configuration of chromium is against– **Aufbau principle**
- The factor make the separation of Lanthanides a formidable task– **Similarity in ionic size, Constant charge of +3, Small charge radius ratio**
- Lanthanides are characterized by the filling of the– **Antipenultimate 4f energy level**
- The transition metal present in the alloy Gun metal is – **Cu**
- The $KMnO_4$ reacts with acidified $FeSO_4$– **$FeSO_4$ is oxidized and $KMnO_4$ is reduced**
- The group numbers of d-block elements– **3 to 12**
- General electronic configuration of d-block elements is– **$(n-1)d^{1-10}\ ns^{1-2}$**
- Alloy of a metal and a non-metal is a– **Steel**
- The electronic configuration is against Aufbau rule, the elements is– **Pd, Pt, Cu**
- An element M has the electronic configuration $[Ar]3d^{5}4s^{2}$. Its oxide is unlikely to exist– **MO_4**
- The elements that exhibits maximum oxidation state is– **Mn**
- The metal that gives more than one chloride– **Cu**
- The elements that form interstitial compounds– **Transition metals**
- The $KMnO_4$ acts as oxidising agent in acidic medium, the oxidation number of Mn decreases by– **5**
- Chromyl chloride when dissolves in NaOH solution gives yellow solution. The yellow solution contains– **CrO_4^{2}**
- An inorganic compound 'y' on heating gives a green coloration & evolves O_2 gas. Then, y is– **$K_2Cr_2O_7$**
- Acidified potassium dichromate is treated with hydrogen sulphide. In the reaction, the oxidation number of chromium– **Decreases from +6 to +3**
- $4K_2Cr_2O_2 \xrightarrow{heat} 4K_2CrO_4 + 3O_2 + X$. Reaction X is– **$Cr_2O_3$**
- Arrange Ce^{+3}, La^{+3}, Pm^{+3} and Yb^{+3} in increasing order of their ionic radii– **$Yb^{+3} < Pm^{+3} < Ce^{+3} < La^{+3}$**
- The colour of $K_2Cr_2O_7$ changes from red orange to lemon yellow on treatment with aqueous KOH because of– **The conversion of dichromate to chromate**
- Stainless steel contains– **Fe + Cr + Ni**
- The elements of transition series are those which have– **Incomplete inner orbitals**
- Mn^{2+} can be converted into Mn^{7+} by reacting with– **PbO_2**
- Acidified $K_2Cr_2O_7$ solution turns green when Na_2SO_3 is added to it. This is due to the formation of– **$Cr_2(SO_4)_3$**
- The calomel reacts with NH_4OH, we get– **$HgNH_2Cl$**
- The formula of calomel is– **Hg_2Cl_2**
- Metal oxides which decomposes on heating is– **HgO**
- Mild oxidising agent is– **Ag_2O**
- Amalgams are– **Alloys contain mercury as one of the contents**
- Pure con. HNO_3 makes iron passive as the surface is covered with protective layer of– **Fe_3O_4**

Search on TG: @apna_pdf

@apna_pdf

- A nitrate when mixed with common salt gives a white precipitate is soluble in dilute NH_4OH. It is the nitrate of– **Silver**
- Zinc when reacted with excess of NaOH gives– **Sodium zincate**
- Reaction of zine with cold and very dilute nitric acid yields– **$Zn(NO_3)_2 + NH_4NO_3$**
- The pair that is referred as 'chemical twins' is– **Tc, Re**
- Across the lanthanide series, the basicity of the lanthanide hydroxides– **Decreases**
- The 4f-electrons do not affect the properties of lanthanoids because they– **Lie well in the interior of the atom and hence not exposed of surroundings**
- The electronic configuration of Cu(II) is $3d^9$ where as that of Cu(I) is $3d^{10}$ is– **Cu(II) is more stable**
- Generally, transition elements form coloured salts due to the presence of unpaired electrons. The compounds coloured in solid state will be– **CuF_2**
- On addition of small amount of $KMnO_4$ to concentrated H_2SO_4, a green oily compound is obtained which is highly explosive in nature. The compound from the– **Mn_2O_7**
- The magnetic nature of elements depends on the presence of unpaired electrons. The configuration of transition element, which shows highest magnetic moment is– **$3d^5$**
- The oxidation state that is common for all lanthanoids– **+3**
- The reaction that are disproportionation reactions– **$Cu^+ \rightarrow Cu^{2+} + Cu$,**

  $3MnO_4^{2-} + 4H^+ \rightarrow 2MnO_4^- + MnO_2 + 2H_2O$
- When $KMnO_4$ solution is added to oxalic acid solution, the decolurrisation is the beginning but becomes instantaneous after some time because– **Mn^{2+} acts as autocatalyst**
- $KMnO_4$ acts as an oxidising agent in acidic medium. The number of moles of $KMnO_4$ that will be needed to react with one mole of sulphide ions in acidic solution is– **$\frac{2}{5}$**
- Mn_2O_7, CrO_3, Cr_2O_3, CrO, V_2O_5, V_2O_4 amphoteric oxide is– **V_2O_5, Cr_2O_3**
- Gadolinium belongs to 4f series. Its atomic number is 64. the electronic configuration of gadolinium is– **$[Xe]4f^75d^16s^2$**
- The magnetic moment is associated with its spin angular momentum and orbital angular momentum. Spin only gagnetic moment value of Cr^{3+} ion is– **3.87 BM**
- $KMnO_4$ acts as an oxidising agent in alkaline medium. When alkaline $KMnO_4$ is treated with KI, iodide ion is oxidised to– **IO_3^-**
- When acidified $K_2Cr_2O_7$ solution is added to Sn^{2+} salt then Sn^{2+} changes to– **Sn^{4+}**
- Generally transition elements and their salts are coloured due to the presence of unpaired electrons in metal ions. The compounds are coloured– **$KMnO_4$**
- Transition elements show magnetic moment due to spin and orbital motion of electrons. The metallic ions have almost same spin only magnetic moment is– **Co^{2+}**
- The actinoids show oxidation states upto +7 is– **Pu, N_p**
- General electronic configuration of actinoids is $(n-2)\ f^{1-14}\ (n-1)\ d^{0-2}\ ns^2$. The actinoids have one electron in 6d orbital is– **U (Atomic number, 92), N_P (Atomic number, 93)**
- The lanthanoids that show +2 oxidation state besides the characteristic oxidation state +3 of lanthanoids is– **Eu**
- The ions that show higher spin only magnetic moment value is– **Mn^{2+}, Fe^{2+}**
- Transition elements form binary compounds with halogens. The elements that will form MF_3 type compounds is– **Cr, Co**
- Gadolinium has a low value of third ionisation enthalpy because of– **High exchange enthalpy**
- In the neutral or faintly alkaline medium, $KMnO_4$ oxidises iodide into iodate. The change in oxidation state of manganese in this reaction is from– **+7 to +4**
- Zr (Z = 40) and Hf (Z = 72) have similar atomic and ionic radii because of– **Lanthanoid contraction**
- The calculated spin only magnetic moment of Cr^{2+} ion is– **4.90 BM**
- 'd-block element is a– **Hg**
- The pairs of ions that have the same electronic configuration– **Fe^{3+}, Mn^{2+}**
- The melting points of Cu, Ag and Au follow the order– **Cu > Au > Ag**
- The melting point of copper is higher than that of zinc because– **the d-electrons of copper are involved in metallic bonding**
- Zr and Hf have almost equal atomic and ionic radii because of– **Lanthanoid contraction**
- The second and third row elements of transition metals resemble each other much more than they resemble the first row because of– **Lanthanoid contraction which results in almost same radii of second and third row metals**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

- Reactivity of transition elements decreases almost regularly from Sc to Cu because of– **Regular increase in ionisation enthalpy**
- The first ionisation energies of the elements of the first transition series (Ti to Cu)– **Increases as the atomic number increases**
- ..... compounds manganese has oxidation number equal to that of iodine in KlO_4– **Potassium permanganate**
- The order of $E^0_{M^{2+}/m}$ values with negative sign for the four successive elements Cr, Mn, Fe and Cu is– **Mn > Cr > Fe > Co**
- ..... d-block element has half-filled penultimate as well as valence subshell– **Cr**
- Fe^{3+} compounds are more stable than Fe^{2+} compounds because– **Fe^{3+} has $3d^5$ configuration (half-filled)**
- The salts of Cu in +1 oxidation state are unstable because– **Cu^+ disproportionates easily to Cu(0) and Cu^{2+}**
- $CuSO_4$ is paramagnetic while $ZnSO_4$ is diamagnetic because– **Cu^{2+} ion has $3d^9$ configuration while Zn^{2+} ion has $3d^{10}$ configuration**
- The order of number of unpaired electrons is– **$Fe^{3+} > Cr^{3+} > Ni^{2+} > Cu^{2+}$**
- The magnetic moment of a divalent ion in aqueous solution with atomic number 25 is– **5.9 B.M.**
- The number of unpaired electrons in gaseous species of Mn^{3+}, Cr^{3+} and V^{3+} respectively are and the most stable species is..... . **4, 3 and 2; Cr^{3+}**
- The transition metal ions that is colourless– **Zn^{2+}**
- Compound that is both paramagnetic and coloured is– **$VOSO_4$**
- Colour of transition metal ions are due to absorption of some wavelength. This results in– **d-d transition**
- Transition metals make the most efficient catalysis because of their ability to– **Adopt multiple oxidation states and to form complexes**
- Interstitial compounds are–**Non-stoichiometric and are neither typically ionic nor covalent in nature**
- Potassium dichromate is prepared from– **Chromate obtained by the fusion of chromite ore with sodium carbonate in free access of air**
- One mole of acidified $K_2Cr_2O_2$ on reaction with excess KI will liberate ..... mole(s) of I_2 – **3**
- ..... compounds is used as the starting material for the preparation of potassium dichromate– **$FeCr_2O_4$ (Chromite)**
- Yellow coloured aqueous solution of sodium chromate changes to orange when acidified with sulphuric acid because– **H^+ ions convert chromate ions to dichromate ions**
- Acidified potassium dichromate reacts with potassium iodide and oxidises it to I_2. The oxidation state of chromium in the products of the reaction is– **+3**
- When a solution of potassium chromate is treated with an excess of dilute nitric acid, it is happen– **$Cr_2O_7^{2-}$ and H_2O are formed**
- In the dichromate anion $(Cr_2O_7^{2-})$ – **6 Cr – O bonds are equivalent**
- The number of moles of $KMnO_4$ that are needed to react completely with one mole of ferrous oxalate in acidic solution is– **3/5**
- The most common lanthanoid is– **Cerium**
- Non-lanthanide element is– **La**
- Lanthanoid contraction is due to increase in– **Effective nuclear charge**
- The trend of basicity of lanthanoid hydroxides– **Decreases across the lanthanoid series**
- The common oxidation state shown by Europium in their compounds is– **+ 3**
- ..... lanthanide ion is paramagnetic is– **Eu^{2+}**
- Magnetic moment of Ce^{3+} ion on the basis of spin only formula will be ..... B.M.– **1.732**
- All Cu(II) halides are known except the iodide. The reason for it is that– **Cu^{2+} oxidizes iodide to iodine**
- ..... lanthanoids is commonly used– **Cerium**
- The total number of inner transition elements in the periodic table– **28**
- The actinoids shows +7 oxidation state are– **Np, Pu**
- lanthanides and actinides resemble in– **Electronic configuration**
- Electronic configuration of a transition element X in +3 oxidation state is $[Ar]3d^5$. Its atomic number is– **26**
- ..... oxidation state is common for all lanthanoids– **+3**
- When $KMnO_4$ solution is added to oxalic acid solution, the decolourisation is slow in the beginning but becomes instantaneous after some time because– **Mn^{2+} acts as autocatalyst**
- The magnetic moment is associated with its spin angular momentum and orbital angular momentum. Spin only magnetic moment value of Cr^{3+} ion is– **3.87 B.M.**

TOPICSPY

Search on TG: @apna_pdf

@apna_pdf

- Gadolinium has a low value of third ionisation enthalpy because of– **High exchange enthalpy**
- In the neutral or faintly alkaline medium $KMnO_4$ oxidises iodide into iodate. The change in oxidation state of manganese in this reaction is from– **+7 to +4**
- Zr (Z = 40) and Hf (Z = 72) have similar atomic and ionic radii because of– **Lanthanoid contraction**
- The pairs, the both transition metal ions are colourless is– **Sc^{3+}, Zn^{2+}**
- The reaction of H_2O_2 with potassium permanganate in acidic medium leads to the formation of mainly– **Mn^{2+}**
- Name the gas that can readily decolourise acidified $KMnO_4$ solution– **SO_2**
- The calculated spin only magnetic moment of Cr^{2+} ion is– **4.90 B.M.**
- The set having ions are coloured and paramagnetic both is– **Cu^{2+}, Cr^{3+}, Sc^{+}**
- The ions exhibits d-d transition and paramagnetism as well– **MnO_4^{2-}**
- Oxidation state of iron in ferric is– **+3**
- The magnetic moment for Mn^{2+} ion is– **5.92 B.M.**
- The manganate and permanganate ions are tetrahedral, due to– **The π-bonding involves overlap of p-orbitals of oxygen with d-orbitals of manganese**
- In presence of acidic medium, $KMnO_4$ converts H_2S into– **S only**

EXAM POINT

Electronic Configuration and characteristics of d-f block elements

The electronic configuration of a transition element 'X' in +3 oxidation state is [Ar] $3d^5$. The atomic number is – **26**	**Assam CEE-2019 JCECE - 2013**
Electronic configuration of an element 'X' having atomic number 24 is– **[Ar] $3d^5$ $4s^1$**	**UP CPMT-2010 BCECE-2005 AP EAMCET-(Medical)-1997**
When mercuric iodide is added to aqueous solution of potassium iodide.– **Freezing point is raised**	**CG PET-22.05.2022**
In 3d series, the metal having the highest M^{2+}/M standard electrode potential is– **Cu**	**JEE Main-27.06.2022, Shift-II**
The only Lanthanoid which is radioactive– **Promethium**	**Karnataka CET-17.06.2022, Shift-II**
The elements with full d^{10} electronic configuration in their " +2" oxidation state are– **Zn, Cd, Hg**	**TS EAMCET-20.07.2022, Shift-I**
The outer electronic configuration of "Pd" is– **$4d^{10}5s^0$**	**AP EAMCET-07.07.2022, Shift-I**
The element with the electronic configuration [Kr]$4d^{10}5s^0$ is– **Pd**	**AP EAMCET-07.07.2022, Shift-I**
The electronic configuration of Fe^{3+} is (atomic number of Fe = 26)– **[Ar] $3d^5 4s^0$**	**AP EAPCET 19-08-2021, Shift-II**
Cuprous ion is colourless while cupric ion is coloured because– **cuprous ion has a complete d-orbital and cupric ion has incomplete d-orbital.**	**COMEDK-2020**
Although Zirconium belongs to 4d-transition series and Hafnium belongs to 5d transition series, even then they show similar physical and chemical properties because_____.– **Both have similar atomic radius**	**GUJCET-2020**
According to recent reports, acid rain is caused by– **excessive release of NO_2 and SO_2 in atmosphere by burning of fossil fuel.**	**AIIMS-27 May, 2018 (M)**
Metals usually used as catalysts belong to – **d-block**	**Manipal-2016**
The electronic configurations of chromium (at. no. 24) and copper (at. no. 29) are – **[Ar] $4s^1 3d^5$ and [Ar] $4s^1 3d^{10}$**	**Manipal-2016**

TEAM SPT

Search on TG: @apna_pdf

@apna_pdf

Transition metals have general electronic configuration – **$ns^{1-2}(n-1)d^{1-10}$**	**MPPET-2013 MHT CET-2008**
A complex compound of Co^{3+} with molecular formula $CoCl_x.yNH_3$ gives a total of 3 ions when dissolved in water. How many Cl^- ions satisfy both the primary and secondary valencies in this complex– **1**	**AP EAMCET-2005**
Copper displaces silver from silver nitrate solution. Hence– **copper is more electropositive than silver**	**COMEDK-2011**
The number of unpaired electrons is maximum in (Atomic number Ti=22, V= 23, Cr= 24, Fe=26)– **Cr**	**CG PET-2007**
The element with the outer electronic configuration $3d^64s^2$ is a – **Transition metal**	**BITSAT-2007**
The elements Re, Os and Ir belong to– **third transition series**	**AMU-2013**
The electronic configuration of a dipositive ion M^{2+} is 2, 8, 14 and its mass is 56. The number of neutrons present is– **30**	**Assam CEE-2014**
In chromite ore, the oxidation number of iron, and chromium are respectively– **+2, +3**	**BCECE-2014**
The number of unpaired electrons in $Fe^{3+}(Z=26)$ is– **5**	**CG PET-2005**
The outer electronic configuration of Gd (At. no. 64) is– **$4f^7, 5d^1, 6s^2$**	**AIEEE-2011**
A transition element X has the configuration $[Ar]d^4$ in its +3 oxidation state. Its atomic number is– **25**	**JCECE - 2010**
The electronic configuration of Cu^{2+} ion is– **$[Ar]\ 3d^9 4s^0$**	**Karnataka CET-2013**
The oxidation state of Fe in the brown ring complex $[Fe(H_2O)_5\ NO]\ SO_4$ is– **+1**	**Karnataka CET, 2009**
An element with atomic number 21 is a– **transition element**	**Karnataka CET, 2008**
The electronic configuration of Cr^{3+} is– **$[Ar]\ 3d^3\ 4s^0$**	**Karnataka CET-2007**

2. The Lanthanoids and actinoids

The pair of lanthanoid ions which are diamagnetic is- **Ce4+ and Yb2+**	**NEET-05.05.2024**
The lanthanide contraction is responsible for the fact that– **Zr and Hf have almost the same radii**	**BCECE-2018, CG PET-2012 UPTU/UPSEE-2007 AIPMT -1997**
The atomic number of cerium (Ce) is 58. The correct electronic configuration of Ce^{3+} ion is– **$[Xe]4f^1$**	**WB JEE-2015**
The Eu^{2+} ion is a strong reducing agent in spite of its ground state electronic configuration (outermost) : [Atomic number of Eu = 63]– **$4f^7$**	**JEE Main 2021, 31 Aug Shift-II**
The electronic configuration of $_{59}Pr$ (Praseodymium) is– **$[Xe]4f^3 6s^2$**	**TS EAMCET-2017**
The electronic configurations of Eu(Atomic No.63), Gd (Atomic No. 64) and Tb (Atomic No. 65) are– **$[Xe]4f^7 6s^2$, $[Xe]4f^7\ 5d^1\ 6s^2$ and $[Xe]4f^9\ 6s^2$**	**BITSAT-2017**
The $4f$ level is successively filled up in– **lanthanides**	**EAMCET-1992, 93**
The most common oxidation state in lanthanide group is– **+3**	**AMU-2019 J & K CET-(2013)**
Mischmetal is an alloy consisting mainly of– **lanthanoid metals**	**JEE Main 2020, 6 Sep Shift-II**
The correct basicity order of the following lanthanide ions is– **$La^{3+} > Ce^{3+} > Eu^{3+} > Lu^{3+}$**	**WB JEE-2017**
The lanthanide contraction is due to– **imperfect shielding of 4f-electrons**	**SRMJEEE-2016**
The electronic configuration of Gd^{2+} is (Atomic number of Gd is 64)– **$[Xe]4f^7 5d^1$**	**Karnataka CET-2015**
The hardest lanthanide element is– **Gd**	**Kerala-CEE-2015**
The only radioactive element among the lanthanoids is– **promethium**	**MHT CET-2015**

Search on TG: @apna_pdf

@apna_pdf

Across the lanthanide series, the basicity of the lanthanide hydroxides–**Decreases**	**VITEEE- 2010**
Between actinides and lanthanides, the complex formation tendency is more for– **actinides due to high charge to size ratio.**	**SRMJEEE-2012**
Lanthanide contraction is the characteristic property of 4f-block elements which is associated with the increase in– **effective nuclear charge**	AMU-2008
The electronic configuration of cerium is– **[Xe] $4f^1$, $5d^1$, $6s^2$**	AMU – 2007
Ce-58 is member of– **f-block elements**	**BCECE-2011**
The lanthanide element that has the electronic configuration, $[Xe]4f^7 5d^1 6s^2$ is– **gadolinium**	**J & K CET-(2011)**
Reason of lanthanoid contraction is– **negligible screening effect of 'f' -orbitals**	**(NEET-2014)**
Across the lanthanide series, the basicity of the lanthanide hydroxides–**Decreases**	**UP CPMT-2011**
The maximum oxidation state exhibited by actinide ions is– **+7**	**JIPMER-2011** **Kerala-CEE-2010**
The main reason for larger number of oxidation states exhibited by the actinides than the corresponding lanthanides, is– **lesser energy difference between 5f and 6d orbitals than between 4f and 5d orbitals**	**JIPMER-2016, 2007** **NEET -2017,** **COMEDK -2015**
The elements with atomic numbers 101 and 104 belong to - **actinoids and group 4**	**(JEE Main 2020, 4 Sep Shift-I)**
The number of unpaired electrons in the uranium ($_{92}U$) atom is– **4**	**WB JEE-2020**
The highest oxidation state in plutonium (At. no. = 94) is– **+7**	**MHT CET-03.05.2019,** **SHIFT-I**
4n + 1 series is known by– **Neptunium**	**GUJCET-2008**
The secondary precursors of photochemical smog are– **O_3 and PAN**	**[AIIMS-2014]**
The actinoids showing +7 oxidation state are– **Np, Pu**	**UP CPMT-2014**

Some application of d- and f- block element

Oxidation number of Fe in Fe_3O_4 is– **$\frac{8}{3}$**	**JCECE - 2007** **AIIMS - 2013**
The common positive oxidation states for an element with atomic number 24, are– **+2 to +6**	**(JEE Main 2021, 17 March Shift-II)**
The yellow colour of chromate ion and orange colour of dichromate ion is due to– **charge transfer only**	**AP EAMCET (Engg.)** **18.09.2020, Shift-I**
The element that usually does not show variable oxidation states is– **Sc**	**(JEE Main 2019, 11 Jan Shift-I)** **GUJCET-2022**
Platinum, palladium and iridium are called noble metals because– **they are inert towards many common reagents.**	**COMEDK-2017**
With sodium hydroxide, silver nitrate forms a black precipitate of– **Ag_2O**	**COMEDK-2016**
Silvering of mirror is done by– **$AgNO_3$**	**COMEDK-2016**
The purple colour of $KMnO_4$ is due to– **charge transfer**	**VITEEE- 2006**
When copper filing are heated with conc. H_2SO_4 we get– **sulphur dioxide**	**COMEDK-2011**
The number of ions produced in solution by chromium sulphate is– **5**	**COMEDK-2011**
Transitional elements are mostly– **paramagnetic**	**CG PET -2008** **CG PET -2005**
The highest oxidation state exhibited by transition metals is– **+8**	**J & K CET-(2008)**
The 3d-block element that exhibits maximum number of oxidation states is– **Mn**	**J & K CET-(2006)** **MHT CET -2010**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

$H_2C_2O_4$ + $KMnO_4$ in acidic medium reacts to have change in oxidation number of Mn from– **7 to 2**	**JIPMER-2005**
The oxidation state of iron in K_4 [Fe $(CN)_6$] is– **+2**	**Karnataka CET-2007**
Oxidation number of Cr in $Cr_2O_7^{2-}$ is– **+6**	**UP CPMT-2012**
+3 oxidation state is most common in– **Fe (26)**	**UP CPMT-2007**
The oxidation number of chromium in CrO_5 is– **+6**	**UPTU/UPSEE-2010**
In the equation $CrO_4^{2-} + SO_3^{2-} \longrightarrow Cr(OH)_4 + SO_4^{2-}$ the oxidation number of Cr changes from– **+ 6 to + 4**	**UPTU/UPSEE-2008**
Most common oxidation states shown by cerium are– **+3, +4**	**MHT CET-2011, 2008**
The highest possible oxidation states of uranium and plutonium, respectively, are– **+6 and +7**	**(JEE Main 2019, 10 April Shift-II)**
18 carat gold contains– **75% gold**	**CG PET -2007**
Differentiating electron in inner transition elements enters the orbital.– **f**	**J & K CET-2008**
Blister copper is– **Cu having 1% impurity**	**BCECE-2008 UP CPMT-2007 AIIMS-1996**
German silver is an alloy of– **Copper, zinc and nickel**	**JEE Main 2021, 25 Feb Shift-II J & K CET-2010, 2006, 2000, 1999 AIIMS-2001**
The magnetic moment of a transition metal ion is $\sqrt{15}$ BM. Therefore, the number of unpaired electrons present in it, is– **3**	**Karnataka CET, 2009 JCECE - 2012**
The number of unpaired electron in Mn^{2+} ion is– **5**	**WB JEE-30.04.2022**
The major components in Gun metal are– **Cu, Sn and Zn**	**(JEE Main 2021, 24 Feb Shift-I)**
The electrode potential of M^{2+}|M of 3d–series elements shows positive value for– **Cu**	**(JEE Main 2021, 24 Feb Shift-I)**
The oxide that shows magnetic property is– **Mn_3O_4**	**(JEE Main 2021, 18 March Shift-II)**
Potassium permanganate on heating at 513 K gives a product – **Paramagnetic and green**	**(JEE Main 2021, 27 Aug Shift-II)**
The addition of dilute NaOH to Cr^{3+} salt solution will give– **Precipitate of $Cr_2O_3(H_2O)_n$**	**(JEE Main 2021, 27 Aug Shift-II)**
Copper matte contains– **Cu_2S and FeS**	**Assam CEE-2021**
If an aqueous solution of KCN is added to a solution of ferrous salt then the complex formed is represented by– **$[Fe(CN)_6]^{4-}$**	**[BITSAT-2021]**
$K_4[Fe(CN)_6]$ is used in detecting.– **Fe^{3+} ion**	**[BITSAT-2021]**
Acidic dichromate ion reacts with hydrogen peroxide to give deep blue colour, this is due to the formation of – **CrO_5**	**Manipal-2020**
When MnO_2 is heated with PbO_2 and conc. HNO_3, pink colour is obtained due to formation of – **$HMnO_4$**	**Manipal-2020**
The calculated spin only magnetic moment of Cr^{2+} ion is– **4.90 BM**	**(NEET-2020)**
The compounds formed when $KMnO_4$ is heated to 513 K are- **K_2MnO_4, MnO_2 and O_2**	**AP EAMCET (Engg.) 18.09.2020 Shift-I**
The metal ion present in insulin is– **Zn^{2+}**	**COMEDK 2020**
The manganate and permanganate ions are tetrahedral, due to– **the π-bonding involves overlap of p-orbitals of oxygen with d-orbitals of manganese**	**NEET-2019**

Search on TG: @apna_pdf

@apna_pdf

When neutral or faintly alkaline $KMnO_4$ as treated with potassium iodide, iodide ion is converted into 'X', 'X' is– **IO_3^-**	**(Odisha NEET-2019)**
The magnetic moment of Ni^{2+} ion (atomic number of Ni = 28) in BM unit is– **2.84**	**JIPMER-2019**
The transition element having least enthalpy of atomisation is– **Zn**	**(JEE Main 2019, 09 Jan Shift-II)**
Aqua-regia reacts with Pt to yield– **H_2PtCl_6**	**CG PET -2019**
Philosopher's wool is– **ZnO**	**CG PET -2019**
In the reaction $2CuCl_2 + 2H_2O + SO_2 \rightarrow A + H_2SO_4 + 2HCl$, A is – **$CuCl_2$**	**CG PET -2019**
CO forms a volatile compound with– **Ni**	**CG PET -2019**
The pair that has similar atomic radii is– **Mo and W**	**(JEE Main 2019, 12 April Shift-II)**
Chloro compound of vanadium has only spin magnetic moment of 1.73 BM. This vanadium chloride has the formula – **VCl_4**	**AIIMS 26 May 2019 (Evening)**
The reactivity of the transition element usually decreases from Sc to Cu because of– **Continuous increase in ionisation enthalpy**	**UPTU/UPSEE-2018**
The colour of the transition metal ions is due to– **d-d transition**	**BCECE-2018**
Mercury is the only metal which is liquid at 0°C this is due to– **very high ionisation energy and weak metallic bond**	**CG PET -2018**
Dichromate ions in alkaline medium exist as – **CrO_4^{2-}**	**HP CET-2018**
Van-Arkel method is used for removing oxygen and nitrogen present as impurities from metals like– **Ti**	**JCECE - 2018**
Violet colour appears in glass when we add– **Cr^{3+}**	**[AIIMS-26 May, 2018 (M)]**
The effective atomic number of central Cu (at. No. 29) metal in $[Cu(NH_3)_4]\ SO_4$ is – **35**	**Manipal-2017**
Name the gas that can readily decolourise acidified $KMnO_4$ solution– **SO_2**	**(NEET-2017)**
Copper is extracted from sulphide ore using the method.– **auto-reduction**	**AMU-2017**
Mercurous ion $\left(Hg_2^{2+}\right)$ gives white precipitate on reacting with– **KI solution**	**CG PET -2017**
The reaction of zinc with dilute and concentrated nitric acid, respectively, produce– **N_2O and NO_2**	**(JEE Main 2016)**
The bivalent metal ion having maximum paramagnetic behavior among the first transition series elements is– **Mn^{2+}**	**Karnataka CET-2016**
Magnetic moment 2.84 B.M. is given by (At. Number. Ni = 28, Ti = 22, Cr = 24, Co = 27)– **Ni^{2+}**	**(NEET-2015 Cancelled)**
Extraction of mercury from cinnabar is achieved by– **heating it in air**	**J & K CET-(2015)**
Siderite is mainly ore of– **Fe**	**J & K CET-(2015)**
Acidic dichromate ion reacts with hydrogen peroxide to give deep blue colour. This is due to the formation of– **CrO_5**	**CG PET- 2015**
The colour of $KMnO_4$ is due to– **L → M charge transfer transition**	**(JEE Main 2015)**
The magnetic moment of M^{x+} (atomic No. = 25) is $\sqrt{15}$BM. Then, the oxidation number x of M is– **4**	**BCECE-2015**
The number of elements present in the d-block of the periodic table is– **40**	**[BITSAT-2015]**
In tetrahedral permanganate ion π-bonding type between metal and oxygen is– **$d\pi$–$p\pi$**	**COMEDK 2015**
The colour of Cu^{2+}– **Blue**	**MPPET - 2012**
Silver nitrate on heating gives– **Ag, NO_2 and O_2**	MPPET- 2009
Co-ordination number for copper (Cu) is– **12**	MPPET- 2009

JEAM SPY

Search on TG: @apna_pdf

@apna_pdf

Mn_2O_7 dissolves in water to give an acid. The colour of the acid is– **Purple**	**VITEEE- 2011**
"925 fine silver" means an alloy of– **92.5% Ag and 7.5% Cu**	**VITEEE- 2011**
Paramagnetism is common in– **d-block elements**	**SRMJEEE – 2011**
Zinc reacts with hot and concentrated NaOH and forms– **H_2**	**AP EAMCET (Medical) - 2013**
When Cobaltic salt is added to the suspension of bleaching powder– **Calcium metal will be deposited**	**SCRA - 2009**
The number of pπ-dπ'pi' bonds present in XeO_3 and XeO_4 molecules, respectively are– **3, 4**	**AP EAMCET (Engg.)-2009**
Silver is– **monovalent**	**COMEDK 2011**
In acidic medium, potassium permanganate oxidizes oxalic acid to– **carbon dioxide**	**COMEDK 2014**
The purple colour of $KMnO_4$ is due to the transition– **Charge transfer (L→ M)**	**[AIIMS-2009]**
F_2 is formed by reacting K_2MnF_6 with – **SbF_5**	**[AIIMS-2005]**
The magnetic moment of a transition metal ion is found to be 3.87 BM. The number of unpaired electrons present in it is– **3**	**Assam CEE-2014**
Iodide of Millon's base is– **$NH_2HgO.HgI$**	**BCECE-2011**
Transition metal with low oxidation number will act as– **an acid**	**BCECE-2011**
Iodine is formed when KI reacts with a solution of– **$CuSO_4$**	**BCECE-2010**
An extremely hot copper wire reacts with steam to give– **Cu_2O**	**[BITSAT-2012]**
Silver ornaments turn black in the atmosphere. It is due to the formation of– **Ag_2O,Ag_2S**	**CG PET- 2013**
Element showing the phenomenon of allotropy is– **Tin**	**CG PET -2005**
The element with the highest electro positivity is– **Cesium**	**CG PET -2006**
$AgNO_3$ gives red colour with– **K_2CrO_4**	**CG PET -2006**
Cupellation method is used for the extraction of– **Ag**	**CG PET -2006**
TEL is– **antiknocking compound**	**CG PET -2006**
On heating, mixture of Cu_2O and Cu_2S will give– **$Cu+SO_2$**	**(AIEEE 2005)**
Calomel (Hg_2Cl_2) on reaction with ammonium hydroxide gives– **$HgNH_2Cl$**	**(AIEEE 2005)**
The colour of transition metal compound is due to– **incomplete (n-1) d-subshell**	**J & K CET-(2014)**
Silver, gold, platinum, iron, copper and titanium are part of the– **transition metals**	**J & K CET-(2014)**
The tendency of transition metals of form stable complexes is due to their– **high charge/size ratio and vacant d-orbitals**	**J & K CET-(2013)**
The transition metal ions are generally paramagnetic in nature because– **they have one or more unpaired d-electrons**	**J & K CET-(2013)**
Zeise's salt is– **$K[PtCl_3(C_2H_4)]$**	**J & K CET-(2011)**
All Cu(II) halides are known except the iodide. The reason for it is that– **Cu^{2+} oxidizes iodide to iodine**	**J & K CET-(2011)**
Irregular trend in the standard reduction potential value of first and last transition elements is due to– **irregular variation of sublimation enthalpies**	**J & K CET-(2010)**
The alloy of copper that contains zinc is– **brass**	**J & K CET-(2011)**

Search on TG: @apna_pdf

@apna_pdf

The composition of bell metal is–	**Cu (80%), Sn (20%)**	**J & K CET-(2009)**
The catalyst used in the manufacture of ammonia–	**Fe**	**J & K CET-(2008)**
Monel metal is an alloy of–	**Cu, Ni, Fe, Mn**	**J & K CET-(2007)**
Lanthanides and actinides are also called as–	**inner transition elements**	**J & K CET-(2007)**
Hydrogen is not obtained when zinc reacts with–	**dilute HCl**	**J & K CET-(2005)**
Ce^{4+} is stable. This is because of–	**empty d-orbitals**	**JCECE - 2012** **MHT CET -2010**
Spin only magnetic moment value of Cr^{3+} ion is–	**3.87 BM**	**JCECE - 2013**
In a transition series, with increase in atomic-number, the paramagnetism–	**first increases to a maximum and then decreases**	**Karnataka CET-2013**
The atomic number of cobalt is 27. The EAN of cobalt in $Na_3[Co(NO_2)_4\ Cl_2]$ is–	**36**	**Karnataka CET-2012**
The "spin only" magnetic moment of Ni^{2+} in aqueous solution would be [At, No. of Ni = 28]–	**$\sqrt{8}$ BM**	**Karnataka CET-2012**
The spin only magnetic moment of Mn^{4+} ion in nearly–	**4 BM**	**Karnataka CET, 2010**
In the brown ring test, the brown colour of the ring is due to–	**nitrosoferrous sulphate**	Karnataka **-CET, 2008**
In the periodic table metals usually used as catalysts belong to–	d-block	**Karnataka CET-2007**
Formation of coloured solution is possible when metal ion in the compound contains–	**unpaired electrons**	**Karnataka CET-2007**
When hydrogen peroxide is added acidified potassium dichromate, a blue colour is produced due to formation of–	**CrO_5**	**Kerala-CEE-2007**
Effective magnetic moment of Sc^{3+} ion is–	**0**	**Kerala-CEE-2005**
In the dichromate dianion, the nature of bonds are–	**six equivalent Cr–O bonds and one Cr–O–Cr bond**	**Kerala-CEE-2013**
The calculated magnetic moment of a divalent ion of an atom with atomic number 24 in aqueous solution is–	**4.90 BM**	**Kerala-CEE-2014**
When Zn is treated with excess of NaOH, the product obtained is–	**Na_2ZnO_2**	**MHT CET-2011**
The pair, that referred as 'chemical twins' is–	**Tc, Re**	**MHT CET-2009**
The maximum number of unpaired electrons is present in–	**Fe**	**MHT CET-2009**
The purest zinc is made by–	**zone refining**	**MHT CET-2008**
The point of dissimilarity between lanthanides and actinides is–	**they are radioactive in nature**	**MHT CET-2008**
The reaction of aqueous $KMnO_4$ with H_2O_2 in acidic conditions gives–	**Mn^{2+} and O_2**	**NEET-2014**
Acidified $K_2Cr_2O_7$ solution turns green when Na_2SO_3 is added to it. This is due to the formation of–	**$Cr_2(SO_4)_3$**	**(AIPMT -2011)**
Essential component of amalgam is–	**Hg**	**UP CPMT-2005**
Calomel (Hg_2Cl_2) on reaction with ammonium hydroxide gives–	**$HgNH_2Cl$**	**UPTU/UPSEE-2007**
Ni^{2+} ion (Z=28) contains unpaired electrons–	**2**	**UPTU/UPSEE-2014**
In the reduction of $KMnO_4$ by warm acidified oxalic acid, the oxidation number of Mn changes from–	**+ 7 to + 2**	**UPTU/UPSEE-2012**
The metal which deposits copper from copper sulphate, solution is–	**Iron**	**UPTU/UPSEE-2010**
Transition metal ions show colour because–	**they exhibit d–d transition**	**UPTU/UPSEE-2009**
Platinum, palladium and iridium are called noble metal because–	**They are inert towards many common reagents**	**WB JEE-2011**
Calculated magnetic moment value for Fe^{2+} ion in BM is–	**4.90**	**AP EAMCET-05.07.2022, Shift-II**

TEAM SKY

Search on TG: @apna_pdf

@apna_pdf

17. Co-ordination Compound

Werner's theory of co-ordination compound

- The coordination number and oxidation number of Co in $[Co(NH_3)_5SO_4]Cl$ will be– **6 and 3**
- Oxidation state of cobalt in $Na[Co(CO)_4]$ is– **–1**
- The oxidation state of Ni in $K_1[Ni(CN)_4]$– **+2**
- The number of ions given by $[Pt(NH_3)_6]Cl_4$ in a aqueous solution will be– **Five**
- According to Werner's theory of coordination compounds is– **Primary valancy is ionisable**
- According to Werner's theory, the stereochemistry of a complex is determined by– **Only by secondary valencies**
- The central metal ion iron is present in ferric ion is– **$K_3[Fe(CN)_6]$**
- The oxidation number of Co in $[Co(NH_3)_3(NO_2)_3]$ is– **+3**
- According to Werner's theory, the secondary valencies of a central metal atom correspond to its– **Co-ordination number**
- The $[Co(NH_3)_6Cl_3$ ionises in water, the number of ions produced are– **4**
- The transition metal complexes, that does the metal exhibit zero oxidation state is– **$[Ni(CO)_4]$**
- The number of moles of ions produced when one mole of Potassium Ferricyanide is dissolved in water is– **4**
- Silver Chloride dissolves in excess ammonia due to the formation of a soluble complex whose formula is– **$[Ag(NH_3)_2]Cl$**
- Copper sulphate solution forms blue coloured complex with excess of ammonia. Its formula is– **$[Cu(NH_3)_4]^{+2}$**

Definitions of some important terms related to co-ordination compound

- Total number of moles of ions that can be obtained from each mole of $[Co(NH_3)_3Cl_3]$ is– **0**
- The number of ions formed in aqueous solution by the compound $[Co(NH_3)_4\ Cl_2]\ Cl$ is– **2**
- The no. of moles of AgCl obtained when excess $AgNO_3$ is added to one mole of $[Cr(NH_3)_4Cl_2]Cl$– **1**
- An example of double salt is– **Potash alum**
- The groups satisfying the secondary valencies of a cation in a complex are called– **Ligands**
- The primary valency of the metal ion is satisfied by– **Negative ions**
- No. of ionizable & non-ionizable Cl ions in $CoCl_3$, $5NH_3$ respectively are– **2, 1**
- The ligands form a chelate is– **Oxalate**
- The complex ion which has no d-electrons in the central metal atom is– **$[MnO_4]$**
- The ligand $N(CH_2CH_2NH_2)_3$ is– **Tetradentate**
- Metal attached with EDTA in an octahedral complex, has coordination number– **6**
- The ambidentate ligand is– **NO_2^- , CN^-**
- Ligand act as– **Lewis bases**
- The ligand, sulphite is– **SO_3^{2-}**
- The bidentate ligand(s) is– **Ethane-1, 2-diamine, Dimethyl glyoximato**
- The hexadentate ligand is– **EDTA**
- The heteroleptic complex (es) is– **$[Co(NH_3)_4(ONO)_2]$, $[Cr(NH_3)_4(Cl)_2]^+$**
- The ligands that will not chelation– **SCN**
- Diethylenetriamine is– **Chelating agent, Tridentate neutral molecule**
- Ambidentate ligands are– **NO_2^- , SCN^-**
- Tridentate ligand is a– **Diene**
- Cationic complex is a– **$[Cu(NH_3)_4]SO_4$**
- Ligands form a chelate– **Oxalate**
- The number of ligands in $K_4[Fe(CN)_6]$– **6**
- Ligand in a metal carbonyl complex is– **CO**
- Coordination compound is a– **Potassium ferrocyanide**
- 2, 4 Dinitrophenylhydrazine is an example for– **Monodentate ligand**
- Dibromidobis (ethylene diamine) chromium (III) bromide named will be– **$[Cr(en)_2Br_2]Br$**

TOPPER

Search on TG: @apna_pdf

@apna_pdf

Nomenclature of Co- ordination compound

- The correct IUPAC name of $[Pt(NH_3)_2Cl_2]$ is– **Diamminedichloridoplatinum(II)**
- The IUPAC name of the complex $[Ag(H_2O)_2][Ag(CN)_2]$ is– **Diaquasilver(I)dicyanidoargentate(I)**
- The 1UPAC name of the coordination compound $K_3[Fe(CN)_5NO]$ is– **Potassium pentacyanonitrosylferrate(II)**
- The IUPAC name of the compound $[Cr(NH_3)_5(NCS)]$ $[ZnCl_4]$ is– **Pentaammineisothiocyanidochromium (III) tetrachloridozincate(II)**
- The IUPAC name of $[Pt(NH_3)_2Cl_2]$ is– **Diamminedichloridoplatinum (II)**
- IUPAC name of $[Pt(NH_3)_2Cl\ .\ (NO_2)]$ is– **Diamminechloridonitrito-N-Platinum (II)**
- The IUPAC name of $K_2[Cr(CN)_2O_2(O_2)(NH_3)]$ is– **Potassium amminedicyanodioxoperoxochromate (VI)**
- $[Cr(NH_3)_5(NCS)][ZnCl_4]$ The IUPAC name of the compound is– **Pentaammineisothiocyanato chromium (III) tetrachlorozincate (II)**
- $[Pt(NH_3)_3Br(NO_2)Cl]Cl$. The IUPAC name of the complex is– **Triamminebromo-chloronitroplatinum (IV) chloride**
- The IUPAC name of $K_2[Ni(CN)_4]$ is– **Potassium tetracyanonickelate (II)**
- The IUPAC name of the complex ion formed when gold dissolves in aqua-regia is– **Tetra chloridoaurate (III)**
- The IUPAC name of $[Cr(H_2O)_4Cl_2]Cl$ is– **Tetraaquadichlorochromium (III) chloride**
- The IUPAC name of the compound $[Cu(NH_3)_4(NO_3)_2]$ is– **Tetraamminedinitrato copper (II)**
- The IUPAC name of potassium ferrocyanide is– **Potassium hexacyanoferrate (II)**
- Formula of tetraaminechloronitro platinum (IV) sulphate can be written– **$[Pt(NH_3)_4(ONO)Cl]SO_4$**
- The IUPAC name for $[Co(NCS)(NH_3)_5]Cl_2$ is– **Pentaamminethiocyanato-N-cobalt(III) chloride**
- The IUPAC name of the complex $[Pt(NH_3)_2Cl_2]$ is– **Diamminedichloridoplatinum (II)**
- IUPAC name for the complex $[Cu(NH_3)_4]SO_4$ is– **Tetraamminecopper (II) sulphate**
- Hexaaquatitanium (III) Chloride is represented as– **$[Ti(H_2O)_6]Cl_3$**
- The correct IUPAC name of $KAl(SO_4)_2.12H_2O$ is– **Potassium aluminium (III) sulphate –12 water**
- The IUPAC name for the coordination compound $Ba[BrF_4]_2$ is– **Bariumtetrafluorobromate (III)**
- The IUPAC name of $[Ni(NH_3)_4][NiCl_4]$ is– **Tetraamminenickel(II) - tetrachloronickelate(II)**
- The IUPAC name of $[Co(NH_3)_5ONO]^{2+}$ ion is– **Pentaamminenitritocobal(III) ion**
- IUPAC name of $Na_3[CoCl(NO_2)_5]$ is– **Sodium chloropentanitrocobaltate(III)**
- The IUPAC name of the Wilkinsons catalyst $[RhCl(P\ Ph_3)_3]$ is– **Chlorotris(triphenylphosphine) rhodium (I)**

Isomerism in co- ordination compound bonding in co-ordination compound and bonding in metal carbonyls.

- $[Pt(NH_3)_4][CuCl_4]$ and $[Cu(NH_3)_4][PtCl_4]$ are known as– **Coordination isomers**
- Maximum number of isomers is shows– **$[Cr(SCN)_2(NH_3)_4]^+$**
- Compounds $[PtCl_2(NH_3)_4]Br_2$ and $[PtBr_2(NH_3)_4]Cl_2$ shows the type of isomerism– **Ionisation isomerism**
- The complex $[Co(NH_3)_6][Cr(CN_6)]$ and $[Cr(NH_3)_6][Co(CN)_6]$ are the examples of isomerism– **Coordination isomerism**
- The existence of two different coloured complexes with the composition $[Co(NH_3)_4Cl_2]^+$ is due to– **Geometrical Isomerism**
- The isomerism is possible with complex, $[Co(NH_3)_5Br]SO_4$, is– **Ionisation isomerism**
- Linkage isomerism is possible when ligand is– **Ambidentate**
- In the octachedral complex $[Ma_3b_3]$, If three identical ligands occupy positions at the corners of the same face of octahedron, it is called– **Fac-isomer**
- The complex $[Co(NH_3)_4(SCN)_2]Cl$ exhibits the isomerism are– **Linkage, ionization & geometrical**
- $[Co(NH_3)_4Cl_2]NO_2$ and $[Co(NH_3)_4Cl(NO_2)]Cl$ exhibit, type of isomerism– **Ionisation**
- $CrCl_3.6H_2O$ exists in different isomeric forms show different colours like violet and green. This is due to– **Hydrate isomerism**
- The complex, $[Pt(Py)(NH_3)BrCl]$ will have total number of geometrical isomers– **3**
- Total number of geometrical isomers are possible for the complex ion $[Cr(C_2O_4)_3]^{3-}$ – **0**
- The complexes $[Co(NH_3)_6]$ $[Cr(C_2O_4)_3]$ and $[Cr(NH_3)_6]$ $[Co(C_2O_4)_3]$ are– **Co-ordination isomerism**

TEAM SPM

Search on TG: @apna_pdf
@apna_pdf

- The complex or the complex ion will show geometrical isomerism– **$[Pt(NH_3)_2Cl_2]$**
- Cis-trans isomerism is found in square planar complexes of the molecular formula (a and b are monodentate ligands)– **Ma_2b_2**
- The magnitude of magnetic moment of $[NiCl_4]^{2-}$ will be– **2.82 B.M**
- $CuSO_4, 5H_2O$ is blue in colour while $CuSO_4$ is colourless due to–**Due to absence of water (ligand), d-d transitions are not possible in $CuSO_4$**
- The most stable complex among the– **$[Fe(CO)_5]$**
- The complex ion has only three d-electrons in the central metal ion is– **$[Cr(CN)_6]^{3-}$**
- According to CFT, Δ_0 is called– **Crystal field splitting energy**
- In crystal field splitting, in octahedral complexes, the energy order of d-orbitals is– **$e_g > t_{2g}$**
- The complex, $[Ni(CN)_4]^2$, is diamagnetic in nature, its geometry is– **Square planar**
- The complex ion is expected to absorb visible light– **$[Cr(NH_3)_6]^{3+}$**
- The theoretical value of magnetic momentum (μ) when CN^- ligands join Fe^{3+} ion to yield complex will be– **1.73 BM**
- The increasing order of crystal field spitting strength of the ligands is– **$Cl^- < F^- < H_2O < NH_3 < CN^- < CO$**
- The spin only magnetic moment value of $Cr(CO)_6$ is– **0 BM**
- The hybridisation involved in $[Co(C_2O_4)_3]^{3-}$ is– **d^2sp^3**
- The complexes that will show maximum paramagnetism– **$3d^5$**
- The complex that shows zero crystal field stabilisation energy is– **$[Fe(H_2O)_6]^{3+}$**

Importance and application of co-ordination compound

- Bonds present in K_4 [Fe $(CN)_6$] are– **Ionic, covalent and coordinate covalent**
- The hybridisation of the complex $[NiCl_4]^{-2}$ is– **sp^3**
- The shape of the complex species will be square planar if its coordination number is– **4**
- The outer orbital complex is– **$[CoF_6]^{-3}$, $[Cu(H_2O)_6]^{+2}$**
- Hybridisation of $[Ni(NH_3)_6]^{2+}$ and $[Zn(NH_3)_6]^{2+}$ are– **Both sp^3d^2**
- $[Cu(NH_3)_4]^{2+}$ has hybridisation and magnetic moment– **dsp^2, 1.73 B.M.**
- Among the compounds that is both paramagnetic and coloured is– **$VOSO_4$**
- The oxidation number of Fe in Fe $(CO)_5$ is– **Zero**
- The charge on the central metal ion in the complex $[Ni(CO)_4]$ is– **0**
- Zeigler - Natta catalyst is– **$Et_3Al + TiCl_4$**
- Antidote in lead poisoning is used as– **EDTA**
- Organometallic compound is– **CH_3MgBr**
- The central metal ion in heme is– **Fe^{+2}**
- The coordination number of Fe(II) in oxyhaemoglobin is– **6**
- Non-conducting complexes is– **$CoCl_3 .3NH_3$**
- The octahedral complexes of Co(At no. 27) will the magnitude of Δ_0 be the highest– **$[Co(CN)_6]^{3-}$**
- The pairs that represents linkage isomers– **$[Pd(PPh_3)_2(NCS)_2]$ and $[Pd(PPh_3)_2(SCN)_2]$**
- An optical isomer is– **$[Co_9(en)_3]^{3+}$**
- In the brown ring complex $[Fe(H_2O)_5(NO)]SO_4$, nitric oxide behaves as– **NO^+**
- Negatively charged bidentate ligand is– **Dimethyl glyoximato**
- The effective atomic number for $[Rh(H_2O)_6]^{3+}$ (atomic number for Rh is 45) is– **54**
- Amongst $[NiCl_4]^{2-}$, $[Ni(H_2O)_6]^{2+}$ [$Ni(PPh_3)_2Cl_2$], $[Ni(CO)_4]$ and $[Ni(CN)_4]^{2-}$ the paramagnetic species are– **$[NiCl_4]^{2-}$, $[Ni(H_2O)_6]^{2+}$, $[Ni(PPh_3)_2]$**
- Amongst the ions one has the highest magnetic moment value (At. no. : Co = 27, Ni = 28)– **$[CoF_6]^{3-}$**
- The ionization isomer of $[Cr(H_2O)_4Cl(NO_2)Cl$ is– **$[Cr(H_2O)_4Cl_2]NO_2$**
- $[Mn(CO)_6]$ and $[V(CO)_6]$ can act as respectively– **Reducing agent, oxidising agent**
- Mabed (tetrahedral geometry) can show, the isomerisms is– **Optical**
- The magnetic moment of octahedral complex having CFSE = –0.8 Δ_0 and surrounded by weak field ligands can be– **$\sqrt{15}$ B.M. , $\sqrt{8}$ B.M.**
- The compounds that show ionization isomerism– **$[Co(NH_3)_5Br]SO_4$**
- d^2sp^3 hybridised is– **$[NiF_6]^2$, $[IrCl_6]^3$, $[Co(H_2O)_6]^{3+}$**
- The complexes that is example of strongest reducing agent– **$[Co(CN)_6]^{4-}$**
- The complexes that has a geometry different from others– **$[Ni(CN)_4]^{2-}$**
- The complexes that show optical isomerism– **Cis $[Co(en)_2Cl_2]$ Cl**

Search on TG: @apna_pdf
@apna_pdf

- The maximum number of atoms which are in same plane in $[Ni(CO)_4]$ are– **5**
- The complexes $[Pt(NH_3)_4][PtCl_6]$ and $[Pt(NH_3)_4Cl_2][PtCl_4]$ are– **Co-ordination isomers**
- The complexes that show geometrical as well as optical isomerism– **$[Rh(en)_2Cl_2]^+$, $[Co(NH_3)_2(Cl)_2(en)]^+$**
- The compound(s) that exhibit(s) geometrical isomerism or optical isomerism is– **$[Pt(en)_3]Cl_4$, $[Pt(NH_3)_2(CN)_2]$**
- The non-existent metal carbonyl is– **$[Mn(CO)_5]$**
- The nature of Mn_2O_7, V_2O_5 and CrO are, respectively– **Acidic, amphoteric & basic**
- The solution of the complex [Cu(NH3)4]SO4 in water– **Will give the tests of SO_4^{2-} ions**
- $[Co(NH_3)_4(NO_2)_2]Cl$ exhibits– **Linkage isomerism, ionization isomerism and geometrical isomerism**
- AgCl dissolved in excess of NH_3, KCN and $Na_2S_2O_3$ solutions, the complex produces ions– **$[Ag(NH_3)_2]^+$, $[Ag(CN)_2]$ & $[Ag(S_2O_3)_2]^{3-}$**
- The effective atomic number of Cr in $[Cr(NH_3)_6]Cl_3$ is– **33**
- The most stable complex is– **$[Fe(CO)_5]$**
- The complexes formed by Cu^{2+} ions that is most stable– **$Cu^{2+} + 4CN \rightarrow [Cu(CN)_4]^{2-}$, log K = 27.3**
- The complex ion that shows geometrical isomerism is– **$[Cr(H_2O)_4Cl]^+$**
- The compounds $[Co(SO_4)(NH_3)_5]Br$ and $[Co(SO_4)(NH_3)_5]$ Cl represent– **No isomerism**
- Ethylene diaminetetraacetate (EDTA) ion is– **Hexadent ligand with four "O" and two "N" donor atoms**
- The electronic configuration of the central atom in $K_4[Fe(CN)_6$ based on crystal field theory is– **t_{2g}^6 e_g^0**
- Iron carbonyl, $Fe(CO)_5$ is– **Mononuclear**
- The type of isomerism shown by the complex $[CoCl_2(en)_2]$ is– **Geometrical isomerism**
- The geometry and magnetic behaviour of the complex $[Ni(CO)_4]$ are– **Tetrahedral geometry and diamagnetic**
- Copper sulphate dissolves in ammonia due to the formation of– **$[Cu(NH_3)_4]SO_4$**
- The number of ions given by $[Pt(NH_3)_6]Cl_4$ in aqueous solution will be– **Five**
- When one mole of each of the compleses is treated with excess of $AgNO_3$, will give maximum amount of AgCl– **$[Co(NH_3)_6]Cl_3$**
- A coordination compound $CrCl_3.4H_2O$ gives white precipitate of AgCl with $AgNO_3$. The molar conductance of the compound corresponds to two ions. The structural formula of the compound is– **$[Cr(H_2O)_4Cl_2]Cl$**
- According to Werner's theory of coordination compounds– **Primary valency is ionisable**
- The ligand $N(CH_2CH_2NH_2)_3$ is– **Tetradentate**
- Tridentate ligand is a– **Dien**
- Ambidentate ligands are– **SCN^- NO_2^-**
- The ligands form a chelate is– **Oxalate**
- The formula of tetraamminechloridonitro-platinum (IV) sulphate can be written as– **$[Pt(NH_3)_4(NO_2)Cl]SO_4$**
- Tetraammineaquachloridocobalt (III) chloride can be written as– **$[CoCl(H_2O)(NH_3)_4]Cl_2$**
- The formula of complex diamminechlorido-(ethylenediamine) nitroplatinum (IV) chloride is– **$[Pt(NH_3)_2Cl(en)NO_2]Cl_2$**
- The name of the compound $[Co(NH_3)_5NO_2]Cl_2$ will be– **Pentaamminenitrocohalt(III) chloride**
- Total number of geometrical isomers are there for $[Co(NH_3)_2Cl_4]^-$ (octahedral) and $[AuCl_2Br_2]^-$ (square planar)– **Two (cis and trans), two (cis & trans)**
- For the square planar complex [M abcd] where M is the central atom and a,b,c,d are monodentate ligands, the number of possible geometrical isomers are– **Three**
- $[Co(NH_3)Cl(en)_2]^{2+}$ shows two geometrical isomers cis and trans. That is– **cis-isomer will show optical isomerism**
- The complexes that is exists as pair of enantiomers– **$[Cr(en)_3]^{3+}$**
- The compounds exhibits linkage isomerism is– **$[Co(en)_2(NO_2)Cl]Br$**
- $[Pt(NH_3)_4][CuCl_4]$ and $[Cu(NH_3)_4][PtCl_4]$ are known as– **Coordination isomers**
- The isomers will give white precipitate with $BaCl_2$ solution is– **$[Co(NH_3)_5Br]SO_4$**
- $CrCl_3.6H_2O$ exists in different isomeric forms which show different colours like violet and green. This is due to– **Hydrate isomerism**
- The hybridisation involved in $[Co(NH_3)_6]^{3+}$ is– **d^2sp^3**
- The complexes will have tetrahedral shape– **$[NiCl_4]^{2-}$**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

- The complex ion has no d-electrons in the central metal atom is– **$[MnO_4]^-$**
- The lowest value of paramagnetism is shown by– **$[Co(CN)_6]^{3-}$**
- $[CoF_6]^{3-}$ is– **Paramagnetic & undergoes sp^3d^2 hybridisation**
- The magnitude of magnetic moment (spin only) of $[NiCl_4]^{2-}$ will be– **2.82 B.M.**
- Highest paramagnetism is– **$[Fe(H_2O)_6]^{2+}$**
- Using valence bond theory, the complex $[Cr(NH_3)_6]^{3+}$ can be described as– **d^2sp^3, inner orbital complex, paramagnetic**
- When excess of ammonia is added to copper sulphate solution, the deep blue coloured complex is formed. The complex is– **Square planar & paramagnetic**
- $[Mn(CN)_6]^{3-}$ according to valence bond theory is– **d^2sp^3, inner orbital complex, paramagnetic, 2.82 B.M.**
- The spin only magnetic moment value of $Fe(CO)_5$ is– **0 B.M.**
- Maximum paramagnetism complexes will show– **$3d^5$**
- Electronic configuration of $[Cu(NH_3)_6]^{2+}$ on the basis of crystal field splitting theory is– **$t_{2g}^9\ e_g^3$**
- Octahedral complex will be formed– **d^6 (low spin)**
- The value of the 'spin only' magnetic moment for the configuration is 2.84 BM. It is – **d^4 (in strong ligand field)**
- $[FeF_6]^{3-}$ is paramagnetic due to presence of unpaired electrons in the complex. The five electrons remain unpaired because– **F^- is a weak field ligand hence does not cause pairing of electrons**
- $[Co(C_2O_4)_3]^{3-}$ is a diamagnetic complex because– **$C_2O_4^{2-}$ is strong field ligand hence causes pairing of electrons**
- The increasing order of crystal field splitting strength of the given ligands is– **$Cl^- < F^- < H_2O < NH_3 < CN^- < CO$**
- $CuSO_4.5H_2O$ is blue in colour while $CuSO_4$ is colourless due to– **Absence of water (ligand), d-d transitions are not possible in $CuSO_4$**
- $[Fe(CN)_6]4^-$ and $[Fe(H_2O)_6]^{2+}$ show different colours in dilute solution because– **CN^- is a strong field ligand and H_2O is a weak field ligand hence magnitude of CFSE is different**
- A substance appears coloured because– **It absorbs light at specific wavelength in the visible part and reflects rest of the wavelengths**
- The terminal and bridged CO ligands in the compound $[Co_2(CO)_8]$ are respectively– **6, 2**
- The geometry possessed by $[Ni(CO)_4]$ is– **Tetrahedral**
- Cr–C bond in the compound $[Cr(CO)_6]$ shows π-character due to– **Synergic bonding**
- The structure of $Fe(CO)_5$ is (Z = 26 for Fe)– **Trigonal bipyramidal**
- The stabilisation of coordination compounds due to chelation is called the chelate effect. The most stable complex species is– **$[Fe(C_2O_4)_3]^{3-}$**
- The complex ion shows geometrical isomerism is– **$[Cr(H_2O)_4Cl_2]^+$**
- The CFSE for octahedral $[CoCl_6)^{4-}$ is 18,000 cm^{-1}. The CFSE for tetrahedral $[CoCl_4]^{2-}$ will be– **8,000 cm^{-1}**
- The compounds $[Co(SO_4)(NH_3)_5]$ Br and $[Co(SO_4)(NH_3)_5]Cl$ represent– **no isomerism**
- IUPAC name of $[Pt(NH_3)_2Cl(NO_2)]$ is– **Diamminechloridonitrito-N-platinum(II)**
- Ethylene diaminetetraacetate (EDTA) ion is– **Hexadentate ligand with four "O" and two "N" donor atoms**
- According to the valence bond theory the hybridization of central metal atom is dsp^2 for the compounds is– **$K_2[Ni(CN)_4]$**
- The oxidation numbers of Ni in $[Ni(CO)_4]$ and $[Ni(CN)_4]^{2-}$ respectively are– **0 and +2**
- The type of isomerism shown by the complex $[CoCl_2(en)_2]$ is– **Geometrical isomerism**
- Aluminium chloride in acidified aqueous solution forms a complex 'A', in hybridisation state of Al is 'B'. 'A' and 'B', respectively are– **$[Al(H_2O)_6]^{3+}$, sp^3d^2**
- The metal ion forms unstable complex with CN^- – **Cu(I)**
- The compound used in the treatment of lead poisoning is– **EDTA**

Search on TG: @apna_pdf

@apna_pdf

EXAM POINT

Werner's theory of co-ordination compound

The oxidation states of Pt in $[Pt(NH_3)_4]$ $[PtCl_4]$ is– **+2**	**AMU-2019**
Primary valency of Co in $[Co(en)_2Cl_2]Cl$ is– **+3**	**AMU-2017**
The secondary valency and the number of hydrogen bonded water molecules in $CuSO_4.5H_2O$, respectively, are– **4 and 1**	**JEE Main-2021, 18 March Shift-II**
Oxidation state of manganese in $Mn(CO)_5$ is– **0**	**JCECE - 2018**
The oxidation state and covalency of Al in $[Al\,Cl(H_2O)_5]^{2+}$ are respectively– **+3, 6**	**AP-EAMCET (Engg.) - 2014**
The coordination number and oxidation state of Cr in $K_3\left[Cr(C_2O_4)_3\right]$ are respectively– **6 and +3**	**CG PET- 2011**
The tetrahedral complexes have coordination number– **4**	**J & K CET-(2007)**
The oxidation state of chromium in chromium trioxide is– **+6**	**J & K CET-(2007)**

Definitions of some important terms related to co- ordination compound

The crystal field stabilisation energy (CFSE) of $[CoF_3(H_2O)_3]$ ($\Delta_0 < P$) is– **$-0.4\,\Delta_0$**	**[JEE Main 2020, 4 Sep Shift-II]**
Crystal field splitting in octahedral coordination entities, 'e_g' set of orbital's are– **$d_{x^2-y^2}, d_{z^2}$**	**JHARKHAND – 2019**
Crystal field splitting energy for octahedral (Δ_o) and tetrahedral (Δ_t) complexes is related as– $\Delta_t \approx \frac{4}{9}\Delta_o$	**AMU-2019**
The number of unpaired electrons in $Ni(CO)_4$ is– **0**	**BCECE-2007**
Potassium ferricyanide on ionization produces– **4 ions**	**BCECE-2010**

Nomenclature of Co-ordination compound

The IUPAC name of the coordination compound $[Co(H_2O)_2(NH_3)_4]\,Cl_3$ is– **Tetraamminediaquacobalt (III) chloride**	**J & K CET-2015, 1999, 1997**
The correct IUPAC name of cis-platin is– **Diammine dichloride platinum (II)**	**Karnataka CET-17.06.2022, Shift-II**
Formula of hexaaqua manganese (II) phosphate is– $\left[Mn(H_2O)_6\right]_3(PO_4)_2$	**CG PET-2012**
The correct IUPAC name of $[Pt(NH_3)_2Cl_2]$ is– **Diammine dicholorido platinum (II)**	**JCECE - 2013**
The IUPAC name for the complex $[Co(NO_2)(NH_3)_5]Cl_2$ is:– **Pentaammine nitrito - N- cobalt (III) chloride**	**AIIMS 26 May 2019 (Morning) AIEEE-2006**
The IUPAC name of $[Co(NH_3)_5(CO_3)]\,Cl$ is– **Pentaamminecarbonatocobalt (III) chloride**	**Kerala CEE-29.08.2021**
The different types of bonds present in $CuSO_4.5\,H_2O$ are _____ **Ionic, Covalent, Coordinate covalent, Hydrogen bonding only**	**AP EAPCET 25.08.2021, Shift-II**
The IUPAC name of the complex $[Pt(NH_3)_2Cl(NH_2CH_3)]Cl$ is– **Diamminechlorido (methanamine) platinum (II) chloride**	**JEE Main-2020, 7 Jan Shift-I**

TEAM SBK

Search on TG: @apna_pdf

@apna_pdf

The IUPAC name of $[Pt(NH_3)_4]$ $[PtCl_4]$ is– **Tetraamine platinum (II) tetrachlorido platinate (II)**	**Karnataka CET-2020**
The formula of dichlorobis (triphenylphosphine) nickel (II) is– **$NiCl_2[(PPh_3)_3]_2$**	**Kerala CEE-2020**
In photography, hypo is used as– **Complexing agent**	**COMEDK-2020**
The formula of pentaaquanitratochromium (III) nitrate is,– **$[Cr(H_2O)_5NO_3]$ $(NO_3)_2$**	**Karnataka CET-2019**
IUPAC name of the complex $Ba[CuCl_4]$ is– **Barium tetrachlorocuprate (II)**	**MHT CET-03.05.2019, SHIFT-I**
IUPAC name for the complex $[Co(H_2NCH_2CH_2 NH_2)_3]_2(SO_4)_3$ is– **Tris (ethane-1,2- diammine) cobalt (III) sulphate.**	**J & K CET-2019**
The IUPAC name of $[Co (NH_3)_4Cl(NO_2)]Cl$ is– **Tetraamminechloridonitrito-N-cobalt(III) chloride**	**Karnataka CET-2018**
The hypothetical complex chloro-diaquatriamminecobalt (III) chloride can be represented as– **$[CoCl(NH_3)_3 (H_2O)_2] Cl_2$**	**BITSAT-2016**
The common name of $K[PtCl_3(\eta^2C_2H_4)$ is– **Zeise's salt**	**BITSAT-2015**
The IUPAC name of $[Co(NH_3)_3(NO_2)_3]$ is– **Triammine trinitro-N cobalt (III)**	**MHT CET-2015**
The name of complex ion, $[Fe(CN)_6]^{3-}$ is– **Hexacyanidoferrate (III) ion**	**AIPMT-2015**
The IUPAC name of $Ni(CO)_4$ is :– **Tetracarbonylnickel(0)**	**MPPET-2013**
The IUPAC name for the complex $[Co(NO_2)(NH_3)_5]Cl_2$ is– **Pentaamminenitrito-N-cobalt (III) chloride**	**VITEEE- 2011**
The IUPAC name of the compound $\left[Co\left(NH_3\right)_5 Cl\right]Cl_2$ is– **Pentaamine chloro cobalt (III) chloride**	**VITEEE- 2008**
The IUPAC name of $[Ni(PPh_3)_2Cl_2]^{2+}$ is– **Dichloro bis (triphenylphosphine) nickel (II)**	**VITEEE- 2007**
The IUPAC name of $[Co (NH_3)_6]$ $[Cr(C_2O_4)_3]$ is– **Hexa-amine cobalt (III) tris (oxalato) chromate (III)**	**MPPET-2008**
The IUPAC name of K_2 $[Ni(CN)_4]$ is– **Potassium tetracyno nickelate (II)**	**MPPET-2008**
CO ligand is– **carbonyl**	**COMEDK-2011**
IUPAC name of $[CrCl_2(NH_3)_4]NO_3$ is– **Tetraamminedichlorochrmium (III)nitrate.**	**COMEDK-2012**
The IUPAC name for $[CrF_2(en)_2]$ Cl is– **Difluoridobis–(ethylene diamine)–chromium (III) chloride**	**Karnataka NEET-2013**
The IUPAC name of the complex $Hg[Co(CNS)_4]$ is– **Mercury tetrathiocyanatocobaltate (II)**	**AIIMS-2010** **AMU – 2008**
The complex $\left[Co(ONO)\left(NH_3\right)_5\right]SO_4$ is named as– **Pentamminenitritocobalt (III) sulphate**	**CG PET- 2010**
IUPAC name of the complex $K_3[Al(C_2O_4)_3]$ is– **Potassium trioxalatoaluminate(III)**	**J & K CET-2010**
The metal-carbon bond in metal carbonyls possesses– **Both s and p character**	**J & K CET-2010**
The non-existent metal carbonyl among the following is– **$Mn(CO)_5$**	**J & K CET-2009**
The IUPAC name of the complex $[Co(NH_3)_4 Cl_2]$ Cl is– **Tetraammine dichloro cobalt (III) chloride**	**Karnataka CET-2011**

Search on TG: @apna_pdf

@apna_pdf

IUPAC name of $Na_3[Co(NO_2)_6]$ is– **Sodium hexanitro cobaltate (III)**	**Karnataka CET-2007**
The IUPAC name of the complex $[Co(NH_3)_2(H_2O)_4]Cl_3$ is– **Diamminetetraaquacobalt (III) chloride**	**Kerala CEE-2014**
The IUPAC name of $K_2[PtCl_6]$ is:– **Potassium hexachloroplatinate (IV)**	**UPTU/UPSEE-2006**
The IUPAC name of $[Pt(NH_3)_3Br(NO_2)Cl]Cl$ is– **Triamminebromochloronitroplatinum (IV) chloride**	**CG PET- 2011**

Isomerism in co-ordination compound bonding in co-ordination compounds and bonding in metal carbonyls.

White precipitate of AgCl dissolves in aqueous ammonia solution due to formation of– **$[Ag(NH_3)_2]Cl$**	**JEE Main-25.06.2022, Shift-I**
$[Co(NH_3)_5SO_4]Br$ and $[Co(NH_3)_5Br]SO_4$ are– **Ionisation isomers**	**JCECE - 2018** **AMU-2013** **CG PET -2005, 2004**
The geometrical and optical isomers of complex $[Pt(NH_3)(Br)(Cl)(Py)]$ are– **3,0 respectively**	**GUJCET-2022** **CG PET- 2013** **AIPMT -2011**
$[Co(NH_3)_5ONO]Cl_2$and$[Co(NH_3)_5NO_2]Cl_2$ show– **Linkage isomerism**	**Kerala CEE -03.07.2022** **J & K CET-1998, 1997**
Number of stereoisomers exhibited by $[Co(en)_2Cl_2]^+$ is– **3**	**Karnataka-CET-2020, NEET-2015**
The existence of two different coloured complexes of $[Co(NH_3)_4Cl_2]^+$ is due to :– **Geometrical isomerism**	**Manipal-2019, AIPMT - 2010**
The number of geometrical isomers found in the metal complexes $[PtCl_2(NH_3)_2]$, $[Ni(CO)_4]$, $[Ru(H_2O)_3Cl_3]$ and$[CoCl_2(NH_3)_4]^+$ respectively are– **2,0,2,2**	**JEE Main-2021, 27 July Shift-I**
The type of isomerism shown by the complex $[CoCl_2(en)_2]^+$ is– **Geometrical isomerism**	**TS EAMCET 09.08.2021, Shift-I**
The number of isomers possible for $[Pt(en)(NO_2)_2]$ is– **3**	**JEE Main-2020, 4 Sep Shift-I**
$CuSO_4$ reacts with KCN solution and forms– **$K_3[Cu(CN)_4]$**	**COMEDK-2020**
Ethylene diamine is an example of – **Bidentate ligand**	**Manipal-2018**
The type of isomerism present in nitropentamine chromium (III) chloride is – **Linkage**	**Manipal-2018**
The type of isomerism shown by the complex $[CoCl_2(en)_2]$ is– **Geometrical isomerism**	**NEET 2018**
Formula for Wilkinson's catalyst is– **$[(Ph_3P)_3RhCl]$**	**AMU-2017**
The complex compounds which gives 5 isomers where (M = metal; a, b, c, d, e, f = ligands)– **$Ma_2b_2c_2$**	**CG PET-2016**
The compounds $[Co(SO_4)(NH_3)_5]Br$ and $[Co(SO_4)(NH_3)_5]Cl$ represent– **No isomerism**	**JCECE - 2015**
The complex $[PtCl_2(en)_2]^{2+}$ ion shows– **Geometrical and optical isomerism**	**COMEDK-2014**
The structure of paramagnetic nickel complex, $[NiCl_4]^{2-}$ is– **Tetrahedral**	**AMU-2013**
$[Fe(NO_2)_3Cl_3]$ and $[Fe(ONO)_3Cl_3]$ shows– **Linkage isomerism**	**AIIMS-2008** **Karnataka CET-2018**
$[(C_6H_5)_2Pd(NCS)_2]$ and$[(C_6H_5)_2Pd(SCN)_2]$ are– **Linkage isomeric**	**CG PET-2008**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

$[Pt(NH_3)_4Cl_2]Br_2$ and $[Pt(NH_3)_4Br_2]Cl_2$ are related to each other as– **Ionisation isomers**	**CG PET-2007 J & K CET-2008**
The total number of possible isomers for the complex compound $[Cu^{II}(NH_3)_4][Pt^{II}Cl_4]$ are– **4**	**J & K CET-2005**

Importance and application of co-ordination compound

During the preparation of Mohr's salt solution (Ferrous ammonium sulphate), acid is added to prevent hydrolysis of Fe^{2+} ion- **Dilute sulphuric acid**	**NEET-05.05.2024**
The E° value for the Mn^{3+}/Mn^{2+} couple is more positive than that of Cr^{3+}/Cr^{2+} or Fe^{3+}/Fe^{2+} due to change of- **d^5 to d^4 configuration**	**NEET-05.05.2024**
Spin only magnetic moment in BM of $[Fe(CO)_4(C_2O_4)]^+$ is– **1.73**	**JEE Main 2021, 31 Aug Shift-II**
The calculated magnetic moments (spin only value) for species $[FeCl_4]^{2-}$, $[Co(C_2O_4)_3]^{3-}$ and MnO_4^{2-} respectively are **4.90, 0 and 1.73 BM**	**JEE Main 2021, 24 Feb Shift-II**
The geometries of $[Ni(CO)_4]$, $[PtCl_4]^{2-}$ and $[Co(NH_3)_6]^{3+}$ respectively are– **Tetrahedral, Square planar and Octahedral**	**AP EAPCET 24.08.2021 Shift-II**
The magnetic moment of Fe^{2+} is- **4.9 B.M.**	**AP EAPCET 19-08-2021, Shift-II**
The coordination number of Fe and Co in the complex ions, $[Fe(C_2O_4)_3]^{3-}$ and $[Co(SCN)_4]^{2-}$ are respectively– **6 and 4**	**Karnataka CET-2020**
Coordination number of caesium in caesium chloride is– **8**	**COMEDK-2020**
The coordination number of Th in $K_4[Th(C_2O_4)_4(H_2O)_2]$ is- **10**	**JEE Main 2019, 11 Jan Shift-II**
The coordination numbers of Co and Al in $[CoCl(en)_2]Cl$ and $K_3[Al(C_2O_4)_3]$, respectively, are (en = ethane–1, 2-diamine)– **5 and 6**	**JEE Main 2019, 12 April Shift-II**
The coordination number of the metal in $[CoBr_2(en)_2]^+$– **6**	**J & K CET-2019**
The hybridization and magnetic behavior of complex $[Ni(CO)_4]$ is– **sp^3, diamagnetic**	**AIIMS 25 May 2019 (Morning)**
The coordination number of central metal atom in a complex is determined by– **The number of ligands around a metal ion bonded by sigma bonds**	**Manipal-2018**
Coordination number of Zn in ZnS is – **4**	**Manipal-2018**
The colour and magnetic nature of manganate ion $[MnO_4]^{2-}$ is– **Green, Paramagnetic**	**MHT CET-2017**
Coordination number of Co in $[Co(NH_3)_6]Cl_3$– **+ 6**	**VITEEE-2016**
Coordination number of Ni in $[Ni(C_2O_4)_3]^{4-}$ is– **6**	**VITEEE- 2010**
Coordination number of Fe in the complexes $[Fe(CN)_6]^{4-}$, $[Fe(CN)_6]^{3-}$ and $[FeCl_4]^-$ would be respectively– **6,6,4**	**CG PET -2007**
The spin only magnetic moment of $[CrF_6]^{4-}$ (atomic number for Cr is 24) is– **4.9 BM**	**J & K CET-(2012)**
The co-ordination number of cobalt in $[Co(CN)(H_2O)(en)_2]^{2+}$– **6**	**J & K CET-(2013)**
The secondary valency of platinum in tetra amminedichloroplatinum (IV) chloride is– **6**	**Karnataka-CET-2012**
The spin only magnetic moment of Fe^{2+} ion (in BM) is approximately– **5**	**Karnataka-CET-2011**

Search on TG: @apna_pdf

@apna_pdf

The coordination number and oxidation state of central atom for $[TiF_9]^{6-}$ are respectively– **9, + 3**	**UP CPMT-2014**
The number of unpaired electrons are present in **$[CoF_6]^{3-}$** is– **4**	**TS EAMCET 10.08.2021, Shift-II (AIPMT -2003)**
The hybridisation of $[Ni(CN)_4]^{2-}$ and $[Ni(NH_3)_6]^{4+}$ ions are respectively.– **dsp^2, d^2sp^3**	**CG PET -2019, AIPMT-2015, 2004**
The hybridization and magnetic nature of $\left[Mn(CN)_6\right]^{4-}$, respectively are :– **$d^2sp^3$ and paramagnetic**	**JEE Main 25-02-2021, Shift-I**
The type of hybridisation and magnetic property of the complex $[MnCl_6]^{3-}$, respectively, are– **sp^3d^2 and paramagnetic**	**[JEE Main 2021, 27 July Shift-I]**
The hybridizations of N-orbitals in NO_3^-, NO_2^- and NH_4^+ respectively are _____ **sp^2, sp^2, sp^3**	**AP EAPCET 23-08-2021 Shift-I**
The complexes $[Ni(CO)_4]$ and $[Ni(CN)_4]^{2-}$ are, respectively– **Tetrahedral and square planar**	**AMU-2019**
The hybridization of Fe in $K_3Fe(CN)_6$ is– **d^2sp^3**	**[BITSAT-2016]**
The number of d-electrons in $[Cr(H_2O)_6]^{3+}$ is– **3**	**MPPET- 2009**
The donor atom in EDTA are– **Two N and Four O**	**Kerala-CEE-2019**
The ligand called π-acid is– **CO**	**COMEDK-2019**
Number of donating atoms present in EDTA– **6**	**JCECE - 2018**
Colour of V^{4+} ion is– **blue**	**JCECE - 2018**
Mohr's salt is– **$FeSO_4(NH_4)_2SO_4.6H_2O$**	**COMEDK-2016**
$[EDTA]^{4-}$ is a– **Hexadentate ligand**	**[BITSAT-2009] UPTU/UPSEE-2004**
The effective atomic number for $[Rh(H_2O)_6]^{3+}$ (atomic number of Rh is 45) is– **54**	**J & K CET-(2012)**
Ethylenediaminetetraacetate ion is a– **Hexadentate ligand**	**J & K CET-(2013)**
A ligand can also be regarded as– **Lewis base**	**Karnataka-CET, 2008**
The purple colour of $KMnO_4$ can be attributed to– **Charge transfer transition**	**AMU-2016**
The colour of copper sulphide is– **Blue**	**[AIIMS-2010]**
The colour in the coordination compounds can be readily explained in terms of– **Crystal field theory**	**J & K CET-(2014)**
The number of bridging CO ligand(s) and Co-Co bond(s) in $Co_2(CO)_8$ respectively are– **2 and 1**	**JEE Main-24.06.2022, Shift-I [JEE Main-2019, 11 Jan Shift-II]**
$Mn_2(CO)_{10}$ is an organometallic compound due to the presence of– **Mn– C bond**	**JEE Main-2021, 26 Feb Shift-II JEE Main-2019, 12 Jan Shift-I**
In $Fe(CO)_5$, the Fe–C bond possesses– **Both σ and π-characters**	**AIEEE-2006**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

18. Surface Chemistry

Adsorption catalysis

- In Freundlich adsorption equation $x/m = kp^{1/n}$, the value of n is– **Always greater than one**
- Chemisorptions involves formation of bond between gaseous molecules or atoms and the solid surface for energy is required, thus it is also referred as– **Activated adsorption**
- Rate of physical adsorption increases with– **Decrease in temperature**
- The ..... is a property of physisorption– **Non-specific nature**
- The adsorption of N_2 over Iron– **Extent of adsorption over iron decreases with the increase in temperature first and then increases**
- The ..... characteristic is associated with adsorption– **ΔG, ΔH and ΔS all are negative**
- According to the adsorption theory of catalysis, the speed of the reaction increases because– **Adsorption lowers the activation energy of the reaction**
- The spontaneous adsorption of a gas– **ΔS is negative and therefore, ΔH should be highly negative**
- There is desorption of physical adsorption when– **Temperature is increased**
- ..... forms multimolecular layer during adsorption– **Physical adsorption, Vander Waal's adsorption Freundlich adsoption**
- ..... is less than zero during adsorption– **ΔG, ΔS, ΔH**
- Freundlich adsorption gives a straight line on plotting– **log x/m versus log P**
- The Langmuir adsorption is deduced using the assumption– **The adsorption sites are equivalent in their ability to adsorb the particles**
- A plot of log x/m versus log p for the adsorption of a gas on a solid gives a straight line with slope equal to– **1/n**
- In Freundlich Adsorption isotherm, the value of 1/n is– **Between 0 and 1 in all cases**
- The intercept on Y-axis in the graph of log $\frac{x}{m}$ versus log P gives– **log k**
- In adsorption from solution phase, the Freundlich adsorption isotherm is modified as– $\frac{x}{m} = kC^{1/n}$
- The phenomenon is seen when coloured dye is removed from the solution of sugar by charcoal?– **Adsorption**
- In adsorption of oxalic acid on activated charcoal, the activated charcoal is called– **Adsorbent**
- The role of adsorption in froth floatation process used especially for concentration of sulphide ores?– **Adsorption of pine oil on sulphide ore particless**
- When adsorption and absorption both take place simultaneously, the phenomenon is known as– **Sorption**
- In chemical adsorption, how many layers are adsorbed– **One**
- Shape selective catalysis is a reaction catalysed by– **Zeolite**
- The best condition for heterogeneous catalysis is– **Adsorption**
- In Ostwald process of manufacturing of HNO_3, catalyst used is– **Pt**
- A biochemical catalyst is– **An enzyme**
- The conversion of maltose to glucose is possible by the enzyme– **Maltase**
- The catalysis can be explained on the basis of adsorption theory– **Heterogeneous catalysis**
- The oxide of nitrogen acts as a catalyst in lead chamber process is– **NO**
- In reactions, heterogeneous catalysis is involved?– $N_2(g) + 3H_2(g) \xrightarrow{Fe(s)} 2NH_3(g)$
- An important zeolite catalyst that is used in the petroleum industry– **ZSM-5**
- The promoter in Haber's process for manufacture of ammonia– **Mo**
- The enzymes convert glucose into ethyl alcohol– **Zymase**
- The dispersed phase and dispersion medium in soap lather are respectively.– **Gas and liquid**
- Fog is a colloidal solution of– **Liquid in gas**
- When dilute aqueous solution of $AgNO_3$ (excess) is added to KI solution, positively charged sol of AgI is formed due to adsorption of– Ag^+

TCARISPY

Search on TG: @apna_pdf

@apna_pdf

- Lyophilic colloids are also known as– **Reversible sols**
- It is naturally occurring man-made macromolecular colloid– **Strarch**
- It is an example of positively charged sol– **Haemoglobin**
- The colloidal system is not form a – **Gas-gas**
- Fog is an example of colloidal system of– **Liquid in Gas**
- The formation of micelles takes place only above– **Kraft temperature**
- The substances behave as colloidal solutions at higher concentration are called– **Associated colloids**
- Movement of dispersion medium under the influence of electric field is known as– **Electroosmosis**
- At CMC (Critical micelle concentration) the surface molecules– **Associate**
- Tyndall effect is not observed in– **Sugar solution**
- The lyophilic sol is added to a lyophobic sol– **Lyophobic sol is protected form coagulation**
- Soap mixed with cater below critical micelle concentration behaves as– **Normal electrolytic solution**
- The size of colloidal particles lie between– **10^{-5}–10^{-7} cm**
- Butter is a colloidal solution of– **Liquid-solid**
- The colloid is– **Blood**
- Gold sol is not– **A macromolecular colloid**
- Milk is a kind of– **Emulsion**
- The simple way to check whether a system is colloidal is– **Tyndall effect**
- Example of lyophilic colloid is– **Glue**
- The physical states of dispersed phase and dispersion medium in colloid like pesticide spray, respectively are– **Liquid, gas**
- The phenomenon observed when a beam of light is passed through a colloidal solution is– **Tyndall effect**
- The presence of electric charge on colloidal particles is indicated by the property called– **Electrophoresis**
- The greater the charge on an ion, the greater is its coagulating power, is– **Hardy - Schulze rule**
- When a sulphur sol is evaporated, sulphur is obtained. On mixing with water, sulphur sol is not formed. The sol is– **Hydrophilic**
- At high concentration of soap in water, soap behaves as– **Associate colloid**
- Hair cream is an example of– **Emulsion**
- Muddy water can be purified through coagulation using– **Alums**
- Blue colour of sea water is due to– **Scattering of light by water**
- During preparation of ice-cream, gelatin is added in icecream. The role of gelatin in the process– **Ice-creams are emulsions get stabilised by gelatin acts as an emulsifying agent**
- The colour of sky is due to– **Wavelength of scattered light**
- During electro-osmosis of $Fe(OH)_3$ sol:– **Dispersion medium moves towards anode**
- The gold numbers of protective colloids A, B, C and D are 0.04, 0.004, 20 and 30 respectively. The protective powers of A, B, C and D are in order– **B > A > C > D**
- The ratio of number of moles of $AgNO_3$, $Pb(NO_3)_2$ and $Fe(NO_3)_3$ required for the coagulation of definite amount of colloidal sol of silver iodide prepared by mixing $AgNO_3$ with excess of KI will be– **6 : 3 : 2**
- According to Hardy Schulze law, the flocculating power of an ion increases with– **Increase in charge**
- If a homogeneous colloid placed in dark and observed in the direction of light, it appears clear and if it is observed from a direction at right angles to the direction of light beam, it appears perfectly dark is known as– **Tyndall effect**
- Among the electrolytes Na_2SO_4, $CaCl_2$, $Al_2(SO_4)_3$ and NH_4Cl, the most effective coagulating agent for Sb_2S_3 sol is– **$Al_2(SO_4)_3$**
- Gold numbers of protective colloids A, B, C and D are 0.50, 0.01, 0.10 and 0.004 respectively. The correct order of their protective powers is– **A < C < B < D**
- The coagulation values in millimoles per litre of the electrolytes used for the coagulation of As_2O_3 are given below: I(NaCl) = 52, II ($BaCl_2$) = 0.69, III ($MgSO_4$) = 0.22 the order of their coagulating power is– **III > II > I**
- The formation of micelles (associated colloids) takes place– **Above CMC and above kraft temperature**
- For Freundlich isotherm, a graph of log x/m is plotted against log P, the slope of the line and its y-axis intercept, respectively corresponds to– **$\frac{1}{n}$, logk**
- The activity of an enzyme becomes ineffective– **At high temperature**
- The surfactant that will form micelles in aqueous solution at the lowest molar concentration at ambient conditions is– **$(CH_3)(CH_2)_{15}N^+(CH_3)_3\ Br^-$**
- At the equilibrium position in the process of adsorption– **$\Delta H = T\Delta S$**
- The interface cannot be obtained– **Gas-gas**
- The term 'sorption' stands for– **Absorption and Adsorption**
- Extent of physisorption of a gas increases with– **Decrease in temperature**

TEAM SRV

Search on TG: @apna_pdf

@apna_pdf

- Extent of adsorption of adsorbate from solution phase increases with– **Increase in amount of adsorbate in solution**
- Physical adsorption of a gaseous species may change to chemical adsorption with– **Increase in temperature**
- In physisorption adsorbent does not show specificity for any particular gas because–**Involved Van der Waals' forces are universal**
- Freshly prepared precipitate sometimes gets converted to colloidal solution by– **Peptisation**
- A colloidal system having a solid substance as a dispersed phase and a liquid as a dispersion medium is classified as– **Sol**
- The values of colligative properties of colloidal solution are of small order in comparison to those shown by true solutions of same concentration because of colloidal particles– **Are comparatively less in number**
- H_2 gas is adsorbed on activated charcoal to a very little extent in comparison to easily liquefiable gases due to– **Very weak van der Waals' forces Very low critical temperature**
- An emulsion cannot be broken by– **Adding more amount of dispersion medium, Adding emulsifying agent**
- When a lyophilic sol is added to a lyophobic sol– **Film of lyophobic sol is formed over lyophilic sol**
- The phenomenon occurs when an electric field is applied to a colloidal solution and electrophoresis is prevented– **Electroosmosis takes place, Dispersion medium begins to move**
- In a reaction, catalyst changes– **Physically, Qualitatively**
- Measuring Zeta potential is useful in determining property of colloidal solution?– **Stability of the colloidal particles**
- The sols, colloidal particles are with negative charge– **Starch**
- The mixture of the solutions will lead to the formation of negatively charged colloidal $[AgI]I^-$ sol– **50 mL of 1 M $AgNO_3$ + 50 mL of 2 M KI**
- The properties does the coagulating power of an ion depend– **Both magnitude and sign of the charge on the ion**

Colloids and their classification emulsion and colloids around us

- Size of colloidal particle ranges between– **1 nm to 100 nm**
- Lyophobic colloids are– **Irreversible collids**
- The ..... processes best describes the purification of muddy water by addition of alum– **Coagulation**
- The ..... is positively charged colloidal particle– **$Al_2O_2.xH_2O$**
- Colloids can be purified by– **Ultrafiltration**
- Movement of colloidal particles under the influence of electric field is called– **Electrophoresis**
- Gelatin is often used as an ingredient in the manufacture of ice-cream. The reason for this is– **To stabilize the colloid and prevent crystal growth**
- Milk can be preserved by adding a few drops of– **Formaldehyde solution**
- When a river enters the sea, a delta is formed. Formation of delta is due to– **Coagulation**
- The potential difference between the fixed charged layer and the diffused layer having opposite charge is called– **Zeta potential**
- When dilute aqueous solution of $AgNO_3$ (excess) is added to KI solution, positively charged sol particles of AgI are formed due to adsorption of ion– **Ag^+**
- In the preparation of AgI sol, $AgNO_3$ is added to excess of potassium iodide solution. The particles of the sol will acquire– **Negative charge**
- During purification of colloidal sol by ultraacentrifugation ..... is observed– **Colloidal particles are settled at the bottom of ultracentrifuge tube**
- A positive colloid will be formed when– **Dilute $AgNO_3$ solution is added to saturated AgI solution**
- Most effective coagulant for a colloidal solution of arsenic sulphide in water is– **Na^+, Al^{+3}**
- Flocculation value is expressed in terms of– **Millimoles of electrolyte per litre of solution**
- Colloidal particles in soap sol carry–**Negative charge**
- When SO_2 gas is bubbled into H_2S gas– **Lyophobic sol of sulphur is formed**
- The stabilization of the dispersed phase in a lyophobic sol is due to– **The formation of an electrical double layer between the two phases**
- When $FeCl_3$ solution is added to NaOH a negatively charged sol is obtained. It is due to the– **Preferential adsorption of OH^- ions**
- Fog is a colloidal solution of– **Liquid in gas**
- The protecting power of lyophilic colloidal sol is expressed in terms of– **Gold number**
- The ability of anion, to bring about coagulation of a given colloid, depends upon– **Both magnitude and sign of charge**
- ..... is commonly used method for destruction of colloid– **By adding electrolyte**
- Pure water can be obtained from sea water by– **Reverse osmosis**
- Colloidal solution commonly used in treatment of eye disease is– **Colloidal silver**
- When a few typical solutes are separated by a particular selective membrane such as protein particles, blood corpuscles, this process is called– **Dialysis**

Search on TG: @apna_pdf

@apna_pdf

- Lyophilic sols are more stable than lyophobic sols because– **The colloidal particles are solvated**
- ..... is the cause of brownian movement of colloids– **Unbalanced impacts by molecules of the dispersion medium**
- When negatively charged colloids solution is– **Self dissociation, Electron capture during Bredig's arc method, Selective adsorption of ion on their surface**
- Hardy-schulze rule states that– **Sols are coagulated by effective ions whose charge is opposite to that of sol & the ions of higher charge are much more effective than the ions of lower charge**
- The decomposition of hydrogen peroxide can be slowed down by the addition of a small amount of acetanilide. The latter act as– **Inhibitor**
- Efficiency of the catalyst depends on its– **Number of free valencies**
- Platinized asbestos is used as a catalyst in the manufacture of H_2SO_4. It is an example of– **Heterogeneous catalyst**
- In the Ostwald's process for the manufacturing of HNO_3, the catalyst used is– **Pt**
- In a reversible reaction a catalyst– **Increases the rate of forward and backing reaction equally**
- In the manufacture of H_2SO_4 by contact process the presence of As_2O_3 acts as– **Catalytic poison**
- Zeolites are used as catalyst in– **Petrochemical industries during cracking**
- Shape selective catalyst are so called because of– **The size of the pores of the catalyst which can trap only selective molecules**
- Micelles formation takes place– **Above CMC and above kraft temperature**
- At the critical micelle concentration (CMC) the surfactant molecules– **Associate**
- Position of non polar and polar part in micelle– **Polar at outer surface but non polar at inner surface**
- The ..... forms micelles in aqueous solution above certain concentration– **Dodecyl trimethyl ammonium chloride**
- The ..... works as Emulsifier in milk– **Casein**
- Emulsifier is an agent– **Stablises the emulsion**
- After the reaction is over between adsorbed reactants, it is important to create space for the other reactant molecules to approach the surface and react. The process responsible for this is known as– **Desorption**
- Property of physisorption is a– **Non-specificity**
- Conditions required for increase in van der Waals' adsorption are respectively– **Low temperature and high pressure**
- Adsorption is accompanied by the evolution of heat. So according to Le-Chatelier principle, the amount of substance adsorbed should– **Increase with decrease in temperature**
- The gases is least adsorbed on charcoal is– **O_2**
- Chemisorption involves formation of bond between gaseous molecules or atoms and the solid surface for ..... high energy is required. Thus it is also referred as– **Activated adsorption**
- In the adsorption of a gas on solid, Freundlich isotherm is obeyed. The slope of the plot is zero. Thus, the extent of adsorption is– **Independent of the pressure of the gas**
- In Freundlich adsorption equation $x/m = kp^{1/n}$, the value of n is– **Always greater than one**
- At low pressure, the fraction of the surface covered follows– **First order kinetics**
- The role of activated charcoal in gas masks used in mines is– **It acts as an adsorbent for poisonous gases present in coal mines**
- The application of adsorption in chemical analysis is– **Adsorption indicators, Qualitative analysis**
- The role of adsorption in froth floatation process used especially for concentration of sulphide ores– **Adsorption of pine oil on sulphide ore particles**
- Larger volume of hydrogen gas, adsorb– **Colloidal solution of palladium**
- The kind of catalysis can be explained on the basis of adsorption theory is– **Heterogeneous catalysis**
- The oxide of nitrogen that acts as a catalyst in lead chamber process is– **NO**
- Example of heterogeneous catalysis is a– $4NH_3 + 5O_2 \xrightarrow{Pt} 4NO + 6H_2O$
- Shape-selective catalysis is a reaction catalysed by– **Zeolites**
- The activity of an enzyme becomes ineffective– **at high temperature**
- Presence of traces of arsenious oxide (As_2O_3) in the reacting gases SO_2 and O_2 in presence of platinised asbestos in contact process acts as–**Catalytic poison**
- The size of colloidal particles ranges between– **$10^{-9} - 10^{-6}$ m**
- The size of particles, in suspension, true solution and colloidal solution, varies in the order– **Suspension > colloidal > true solution**
- The process of froth floatation and chromatography are based on– **Adsorption**
- Gas masks containing activated charcoal to remove poisonous gases from atmosphere acts on principle of– **Adsorption**
- ..... gas is strongly adsorbed by charcoal– **SO_2**
- The volumes of gases H_2, CH_4, CO_2 and NH_3 adsorbed by 1 g of charcoal at 288 K are in the order– **$NH_3 > CO_2 > CH_4 > H_2$**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

- Fog is an example of colloidal system of– **Liquid in gas**
- A colloidal system in liquid is dispersed phase and solid is dispersion medium is classified as– **Gel**
- The factors contribute towards higher stability of lyophilic colloid– **High solvation due to a layer of dispersion medium**
- Substances behave as normal electrolytes in solution at low concentration and exhibit colloidal properties at higher concentration are called– **Associated colloids**
- In these colloids, a large number of small atoms or smaller molecules of a substance aggregate to form colloidal particles having size in colloidal range. These colloids are known as– **Multimolecular colloids**
- The Brownian motion is due to– **Impact of molecules of the dispersion medium on the colloidal particles**
- The formation of micelles takes place only above– **Kraft temperature**
- The critical micelle concentration (CMC) is defined as– **The concentration at which micellization starts**
- At CMC (critical micelle concentration) the surface molecules– **Associate**
- Soap mixed with water below critical micelle concentration behaves as– **Hormal electrolytic solution**
- White of an egg whipped with water acts as– **Macromodecular colloid**
- When a small quantity of $FeCl_3$ solution is added to the fresh precipitate of $Fe(OH)_3$, a colloidal sol is obtained. The process through which this sol is formed is known as– **Peptization**
- Tyndall effect will show– **Aqueous solution of aluminium hydroxide**
- The ferric hydroxide colloid positively charged when prepared by adding ferric chloride to hot water is– **Due to preferential adsorption of Fe^{3+} ions by the sol of $Fe(OH)_3$**
- Movement of dispersion medium under the influence of electric field is known as– **Electroosmosis**
- Alum added to water containing suspended impurities is– **To coagulate the suspended impurities**
- The acts as the best coagulating agent for ferric hydroxide sol is– **Potassium ferrocyanide**
- Electrolyte solutions having the same concentration will be most effective in causing the coagulation of arsenic sulphide sol– **$AlCl_3$**
- The electrolytes Na_2SO_4, $CaCl_2$, $Al_2(SO_4)_3$ and NH_4Cl, the most effective coagulating agent for Sb_2S_3 sol is– **$Al_2(SO_4)_3$**
- Gelatin mixed with gold sol is– **Gold sol is lyophobic sol, gelatin acts as stabilising agent**
- When a lyophilic sol is added to a lyophobic sol, it happens– **Lyophobic sol is protected**
- The separation of an emulsion into its constituent liquids is known as– **Demulsification**
- Some medicines are more effective in the colloidal form because of– **The large surface area and easy assimilation**
- At the equilibrium position in the process of adsorption– **$\Delta H = T\Delta S$**
- The term 'sorption' stands for– **Both absorption and adsorption**
- Extent of physisorption of a gas increases with– **Decrease in temperature**
- Extent of adsorption of adsorbate from solution phase increases with– **Increase in amount of adsorbate in solution**
- Physical adsorption of a gaseous species may change to chemical adsorption with– **Increase in temperature**
- Example of absorption is a– **Water on calcium chloride**
- At high concentration of soap in water, soap behaves as– **Associated colloid**
- Method by lyophobic sol can be protected– **By addition of lyophilic sol**
- Freshly prepared precipitate sometimes gets converted to colloidal solution by– **Peptisation**
- The electrolytes that will have maximum coagulating value for AgI/Ag^+ sol is– **Na_3PO_4**
- A colloidal system having a solid substance as a dispersed phase and a liquid as a dispersion medium is classified as– **Sol**
- The process that is responsible for the formation of delta at a place where rivers meet the sea– **Coagulation**
- "Tyndall effect is exhibited by" is– **Starch solution**
- Measuring zeta potential is useful in determining that property of colloidal solution is– **Stability of the colloidal particles**
- Freundlich adsorption isotherm is representing a– $\frac{x}{m} = kp^{0.3}$
- The properties does the coagulating power of an ion depend – **Both magnitude and sign of the charge on the ion**
- Foam rubber is a ..... colloid– **Solid sol**
- Haemoglobin and gold sol are examples of– **Positively and negatively charged sols, respectively**

Search on TG: @apna_pdf

@apna_pdf

EXAM POINT

Adsorption Catalysis

An example for homogeneous catalysis is– **Lead chamber process**	**SRMJEEE – 2016, J&K CET-2016**
According to the adsorption theory of catalysis, the speed of reaction increases because – **adsorption lowers the activation energy of the reaction**	**Manipal-2019**
Hydrogenation of vegetable oils in presence of finely divided nickel as catalyst. The reaction is– **heterogeneous catalysis**	**Karnataka CET-2017**
The phenomenon of negative catalysis is – **Inhibition**	**MPPET-2013**
A negative catalyst will– **increases the activation energy of the reaction.**	**COMEDK-2012**
Adsorption theory is applicable for– **heterogeneous catalysis**	**Karnataka CET-2013**
$2SO_2(g)+O_2(g) \xrightleftharpoons{V_2O_5}$ is an example for– **heterogeneous catalysis**	**Karnataka CET-2007**
Rate of physical adsorption increases with– **decrease in temperature**	**J & K CET-2009, Karnataka CET, 2009**
In Freundlich adsorption isotherm at moderate pressure, the extent of adsorption $\left(\frac{x}{m}\right)$ is directly proportional to P^x. The value of x is– **$\frac{1}{n}$**	**JEE Main 25-02-2021, Shift-I**
During the adsorption of krypton on activated charcoal at low temperature– **$\Delta H < 0$ and $\Delta S < 0$**	**Karnataka CET-2011, 2001**
Adsorption is accompanied by- **decrease in enthalpy and decrease in entropy**	**Kerala CEE-2020**
The adsorption of inert gases on the surface of activated charcoal increases with– **increase of atomic mass and decrease in temperature.**	**COMEDK-2019**
In adsorption of oxalic acid an activated charcoal the activated charcoal is– **Adsorbent**	**BCECE-2018**
Adsorption of gases on solid surface is generally exothermic because– **Entropy decreases**	**BCECE-2018**
On the basis of Langmuir adsorption isotherm the amount of gas adsorbed at very high pressure– **reaches a constant limiting value**	**JIPMER-2016**
The extent of physisorption of an adsorbate increases with– **decrease in temperature**	**AP-EAMCET(medi)- 2009**
Position of non-polar and polar part in micelle is– **Polar at outer surface and non-polar at inner surface**	**BITSAT – 2011**
At high pressure, the entire surface gets covered by a monomolecular layer of the gas follows– **zero-order**	**BITSAT – 2013**
According to the adsorption theory of catalysis, the speed of the reaction increase because– **adsorption lowers the activation energy of the reaction**	**CG PET -2007**
In chemical adsorption, how many layers are adsorbed– **One**	**CG PET -2005**
The name of a phenomenon in which both adsorption and absorption takes places– **Sorption**	**JCECE - 2012**
Physical adsorption of a gaseous species may change to chemical adsorption with– **increase in temperature**	**JCECE - 2013**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

Colloids and their classification emulsion and colloids around us

Peptisation is the process in which – **Precipitates are converted into colloid.**	**JEE Main 2019, 2 April Shift-I COMEDK 2012, GUJCET-2007**
Sulphur solution is a type of– **multimolecular colloid**	**COMEDK-2015, 2014 AMU–2006**
Colloidal solution commonly used in the treatment of skin disease is– **Colloidal Sulphur**	**Karnataka CET-17.06.2022, Shift-II**
The diameters range of colloidal particles is approximately– **1 to 1000 nm**	**AP EAMCET-04.07.2022, Shift-I**
The colloidal solution used to treat stomach disorders is– **Milk of magnesia**	**AP EAMCET-05.07.2022, Shift-II**
Smoke is an example of colloid– **Aerosol**	**AP EAPCET-11.07.2022, Shift-II**
The nature of charge on resulting colloidal particles when $FeCl_3$ is added to excess of hot water is– **Positive**	**JEE Main 2021, 26 Feb Shift-II**
The charges on the colloidal CdS sol and TiO_2 sol are, respectively– **negative and positive**	**JEE Main 2021, 8 March Shift-II**
Lyophilic sols are more stable than lyophobic sols because– **the colloidal particles are solvated.**	**JEE Main 2021, 27 Aug Shift-II**
Tyndall effect is more effectively shown by– **lyophobic colloid**	**JEE Main 2021, 27 Aug Shift-I**
The protective power of a lyophilic colloidal sol is expressed in terms of– **Gold number**	**AP EAPCET 9-08-2021, Shift-II**
Lyophilic sols are more stable than lyophobic sols, because– **There is a strong electrostatic interaction between the colloidal particles**	**TS EAMCET 10.08.2021, Shift-I**
Tyndall effect is observed when– **the diameter of dispersed particles is similar to the wavelength of light used**	**JEE Main 2020, 3 Sep Shift-I**
The charge on colloidal particles is due to– **Adsorption of ions from the solution**	**AP EAMCET (Engg.) 2.09.2020, Shift-I**
Butter is a colloidal solution of– **liquid-solid**	**JIPMER-2019**
Removal of charge from colloids causes– **Coagulation**	**AIIMS-26 May, 2018 (E)**
Water in oil (W/O), as emulsifying agent is – **Soap**	**AIIMS-27 May, 2018 (M)**
During electrophoresis of colloidal sol of $Fe(OH)_3$, the colloidal particle – **Move towards cathode**	**GUJCET-2018**
Colloidal particles are charged, can be demonstrated using– **Electrophoresis**	**JCECE - 2018**
A method of removing excess solute from a colloidal solution is– **Dialysis**	**UPTU/UPSEE-2018**
Colloidal solution of gold is in different colours like red, purple, blue and golden because of– **size difference in the particles of gold**	**AP EAMCET-2017**
The critical micelle concentration (CMC) is– **the concentration at which micellization starts.**	**COMEDK 2017**
Curd belongs to the type of colloid– **Gel**	**SRMJEEE - 2016**
This acts as a negative catalyst in the decomposition of H_2O_2– **Glycerol**	**SRMJEEE – 2016**
The phenomenon of Tyndall's effect is not observed in– **True solution**	**SRMJEEE – 2016**
In the case of small cuts, bleeding is stopped by applying potash alum. Here alum act as– **coagulating agent**	**COMEDK 2016**

Search on TG: @apna_pdf

@apna_pdf

The disease kala azar is cured by–	**colloidal antimony**	**AIIMS-2016**
Micelles are–	**associated colloids**	**UPTU/UPSEE-2016**
Peptisation involves–	**disintegration of colloidal aggregates**	**VITEEE-2014**
Milk changes after digestion into –	**glucose**	**VITEEE- 2008**
The size of particles in suspension, true solution and colloidal solution varies in the order–	**suspension > colloidal > true solution**	**SRMJEEE – 2007**
Size of colloidal particles is–	**1mμ to 100 mμ**	**SRMJEEE – 2008**
The diameter of the colloidal particle ranges from–	**10 Å to 1000 Å**	**SRMJEEE – 2009**
A silver sol used as an eye lotion is–	**Argyrol**	**SRMJEEE – 2011**
Gelly is a colloidal solution of–	**liquid in solid**	**AP EAMCET (Engg.) 2012**
Negatively charged colloidal solution of clay in water will need for precipitation the minimum amount of–	**aluminium sulphate**	**AMU-2012**
A freshly prepared $Fe(OH)_3$ precipitate is peptized by adding $FeCl_3$ solution. The charge on the colloidal particle of $Fe(OH)_3$ sol is due to adsorption of–	**Fe^{3+} ion**	**Assam CEE-2014**
When dilute aqueous solution of $AgNO_3$ (excess) is added to KI solution, positively charged sol of AgI is formed due to adsorption of –	**Ag^+**	**BCECE-2006**
An emulsion is a colloidal dispersion of –	**a liquid in a liquid**	**BCECE-2005**
The isoelectric-point of a colloidially dispersed material is the pH value at which–	**the dispersed phase does not migrate in an electric field**	**BITSAT – 2014**
A colloidal system consisting of a gas dispersed in a solid is called a/an–	**solid sol**	**JEE Main 202, 7 March Shift-I**
Fog is a colloidal system of–	**liquid in gas**	**J & K CET-2013**
The purification of a colloidal solution could be done by–	**ultrafiltration**	**J & K CET-2013**
The best coagulant for the precipitation of $Fe(OH)_3$ is–	**Na_3PO_4**	**J & K CET-2011**
The phenomenon observed when a beam of light is passed through a colloidal solution is–	**tyndall effect**	**J & K CET-2008**
The protective action of different lyophilic colloids is expressed in terms of–	**gold number**	**J & K CET-2007**
Muddy water can be purified through coagulation using–	**alums**	**J & K CET-2005**
A colloidal system in which a liquid is dispersed in a liquid is called–	**emulsion**	**J & K CET-2002**
Electrophoresis is the movement of colloidal particles under the effect of–	**electric field**	**J & K CET-2002**
The dispersed phase and dispersion medium in soap lather are respectively–	**gas and liquid**	**JIPMER-2011**
Gold number is associated with–	**protective colloids**	**JIPMER-2008**
The stability of a lyophobic colloid is due to–	**the charge on the particles**	**Karnataka CET-2013**
All colloidal dispersions have–	**low osmotic pressure**	**Karnataka CET-2012**
The function of $Fe(OH)_3$ in the contact process is–	**to remove arsenic impurity**	**Karnataka CET, 2009**
The process used to convert fresh precipitate into colloidal state by adding a small amount of electrolyte is called–	**peptisation**	**UP CPMT-2014**
Fog is a colloidal solution of–	**liquid dispersed in gas**	**UP CPMT-2009**
Disperse phase and dispersion medium in butter are respectively–	**Liquid and solid**	**UP CPMT-2008**
Butter is colloidal solution of–	**liquid- solid**	**UP CPMT-2002**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

19. General Principles and Processes of Isolation of Element

Occurrence of Metal

- The ore of Al is– **Bauxite**
- Chromium is present in the gem stone– **Ruby**
- Calamine is an ore of– **Zinc**
- Among the given, Kaolinite is– **$[Al_2(OH)_4\ Si_2O_5]$**
- The oil used as frothing agent in froth floatation process is– **Pine oil**
- The most common impurities present in bauxite ore – **SiO_2**
- We separate two sulphide ores by froth floatation method is– **By adjusting proportion of oil to water or using depressant**
- _____ ore cannot be concentrated by magnetic separation.– **Malachite**
- The used as froth stabiliser in froth floatation method– **Cresols**
- Magnetic separation method is based on– **The differences in magnetic properties of the ore components**
- The metals is extracted by using a silica lined converter is– **Cu**
- Copper matte contains– **Cu_2S and FeS**
- In haematite extraction, limestone is used as– **Flux**
- In the extraction of copper from its sulphide ore, the metal is formed by the reduction of Cu_2O with– **Cu_2S**
- The impurity is most present in the pig iron– **Carbon**
- Slag is represented by– **$CaSiO_3$**
- In blast furnace, iron oxide is reduced by– **Carbon monoxide**
- Ellingham diagram represents change of– **ΔG° with temperature**
- In blast furnace, iron oxide is reduced by– **Carbon monoxide**
- From the Ellingham graph between Gibb's energy and temperature, out of C and CO is a better reducing agent for ZnO– **Carbon**
- In the extraction of copper, the smelt formed in the blast furnace contains– **Cu_2S + little FeS**
- The percentage of carbon in cast iron is– **2.5 - 4.5**
- The purest commercial form of iron– **Wrought Iron**
- _____ metal is extracted by a carbon reduction process– **Iron**
- The slag formed in the extraction of copper is– **$FeSiO_3$**
- After concentration, mixture of oxide ores of iron (Fe_2O_3, Fe_3O_4) is subjected to calcination/roasting to– **Remove water, To oxidise sulphides, To decompose carbonates**
- _____ metal is extracted by electrolytic reduction process.– **Al**
- Hall's process, the main reagent is mixed with– **Na_2AlF_6**
- In cyanide process, silver is extracted from the solution of $Na[Ag(CN)_2]$ by the use of– **Zn**
- In the electrolysis of alumina, cryolite is added to– **Increase the electrical conductivity**
- The mainly used in the extraction of chromium and manganese from their oxides– **Al**
- The metals can be refined using zone refining method– **Germanium, Gallium, Silicon**
- The used for galvanising iron– **Zinc**
- The electrolysis of pure alumina is not feasible because– **It is a bad conductor of elecricity & its fusion temperature is high**
- The formulas of the soluble complexes formed during the extraction of Ag & Au by cyanide process are respectively– **$Na[Ag(CN)_2]$ & $Na[Au(CN)_2]$**
- Auto reduction process is used in the extraction of– **Cu**
- In the commercial electrochemical process for aluminium extraction, the electrolyte used is– **A molten mixture of Al_2O_3 and Na_3AlF_6**
- A sulphide ore is generally converted to the oxide before reduction, because– **Oxides are easer to reduce**
- Carbon cannot be used in the reduction of Al_2O_3 because– **The enthalpy of formation of Al_2O_3 is very high**
- The ore of iron– **Magnetite, Siderite, Haematite**
- The metals obtained by hydrometallurgy are– **Cu**
- Upon heating with Cu_2S, the reagent(s) that give copper metal (is) are– **$CuSO_4$, CuO, Cu_2O**

Search on TG: @apna_pdf

@apna_pdf

- Carbon cannot reduce Fe_2O_3 to Fe at a temperature below 983 K because–**Iron has higher affinity towards oxygen than C.**
- Gravity separation process is used for the concentration of– **Haematite**
- The reactions is an example of autoreduction–$\mathbf{Cu_2O + \frac{1}{2}Cu_2S \rightarrow 3Cu + \frac{1}{2}SO_2}$
- A number of elements are available in earth's crust but most abundant elements are– **Al and Fe**
- In the metallurgy of aluminium– **Graphite anode is oxidised to carbon monoxide and carbon dioxide**
- The methods can be used to obtain highly pure metal which is liquid at room temperature **Distillation**
- The maximum temperature that can be achieved in blast furnace is– **Upto 2200 K**

Concentration ores

- In order to separate ZnS & PbS via froth floatation process, NaCN is added as depressant because– **ZnS form soluble complex $Na_2[Zn(CN)_4]$ & PbS forms the froth**
- The ores are concentrated by froth floatation– **Galena, Copper pyrites**
- The powdered ore is agitated with water or washed with running stream of water. The heavy ore particles and lighter impurities are separated. This method of concentration is known as– **Gravity separation**
- An ore of tin containing, $FeCrO_4$ is concentrated by– **Magnetic separation**
- Sulphide ore of zinc/copper is concentrated by– **Floatation process**
- The ores froth floatation method that is used for concentration– **Zinc blende**
- Froth floatation process of concentration is based on the– **Preferential wetting properties with the frothing agent and water**
- ..... is commonly used to produce foam in forth floatation process– **Pine oil**
- The ores is best concentrated by froth floatation method– **Sphalerite**
- The significance of leaching in the extraction of aluminium is– **It helps in removing the impurities like SiO_2, Fe_2O_3, etc. from the bauxite ore**
- The ore is concentrated by chemical leaching method is– **Argentite**
- In the froth floatation process, the depressant used is– **Sodium cyanide**
- The purpose of addition of NaCN during the process of froth floatation– **A soluble complex is formed by reaction between NaCN and ZnS while PbS forms froth.**
- The role of aniline or cresol when added in a froth floatation process is– **Stabilizer**

Extraction of crude metal from concentrated ore

- Heating pyrites to remove sulphur is called– **Roasting**
- The process of leaching in case of low grade copper ores is– **Leaching is carried out with acids in presence of H_2**
- In the extraction of chlorine by electrolysis of brine– **Oxidation of Cl^- ion to chlorine gas occurs**
- When copper ore is mixed with silica, in a reverberatory furnace copper matte is produced. The copper matte contains– **Sulphides of copper (I) and iron (II)**
- The ores, froth floatation method is used for concentration– **Zinc blende**
- Heating of ore in presence of air to remove sulphur impurities is called– **Roasting**
- Sulphide ore is converted to oxide form by using the process– **Roasting**
- By ..... process zinc is extracted from zinc blende– **Roasting followed by reduction with carbon**
- The process of converting hydrated alumina into anhydrous alumina is called– **Calcination**
- Extraction of zinc from zinc blende is achieved by– **Roasting followed by reduction with carbon**
- Roasting of sulphide ore is generally performed in– **Reverberatory furnace**
- Extraction of gold and silver involves leaching of the metal with CN^- ion. The metal is recovered by– **Displacement of metal by some other metal from the complex ion**
- For the metallurgical process of the ores calcined ore can be reduced by carbon?– **Haematite, Calamine**
- In the extraction of aluminium by Hall-Heroult process, purified Al_2O_3 is mixed with CaF_2 to– **Lower the melting point of Al_2O_3 Increase the conductivity of molten mixture**
- The reactions is an example of calcination process– $\mathbf{MgCO_3 \rightarrow MgO + CO_2}$
- The cathode used in the electrolytic cell during aluminium extraction is made of– **Carbon Lining**
- The methods is based on the difference between specific gravities of the ore and the gangue particles– **Hydraulic Washing**
- The metal is not extracted by leaching– **Mercury**
- The methods is used in the concentration of sulphide ore– **Froth floatation**
- Sphalerite is concentrated by– **Froth floation**
- The froth floatation process is used for the concentration of– **Ore having low density**

TEAMSPY

Search on TG: @apna_pdf
@apna_pdf

- Removal of the unwanted materials from the ore is known as– **Concentration, Dressing and Benefaction**
- The ore is concentrated in froth floatation process– **Zinc blende**
- Sulphide ore of zinc/copper is concentrated by– **Froth floatation**

Thermodynamical principles of metallurgy

- The ..... is acidic flux– **SiO_2**
- Considering Ellingham diagram, metals can be used to reduce alumina– **Mg**
- Ellingham diagram represents change of– **ΔG with temperature**
- The maximum temperature that can be achieved in blast furnace is– **Upto 2200 K**
- Slag formed in blast furnace, removes the impurity of– **SiO_2**
- Cast iron is used for the manufacture of– **Wrought iron and steel**
- In the extraction of copper from its sulphide ore, the metal is formed by the reduction of Cu_2O with– **Cu_2S**
- Blister copper obtained during extraction from cuprous oxide is called so because– **It has blister like eruptions due to evolution of gas**
- The partial roasting of sulphide ore done in metallurgy of copper, because– **Auto-reduction of Cu_2O formed is carried out by remaining Cu_2S in reaction**
- Blister copper is– **Impure copper, Obtained by self-reduction process during bessemerisation**
- From the Ellingham graph between Gibbs energy and temperature, out of C and CO, the better reducing agent for ZnO is– **Carbon**
- The main difference between cast iron and pig iron is– **Cast iron has lower carbon content (3%) as compared to pig iron (4%) and is extremely hard and brittle**
- The Ellingham diagram, metals can be used to reduce alumina– **Mg**
- The main reactions occurring in blast furnace during extraction of iron from haematite ore– **$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$**, **$CaO + SiO_2 \rightarrow CaSiO_3$**
- The method not used in metallurgy to refine the impure metal is– **Amalgamation process**
- When copper ore is mixed with silica, in a reverberatory furnace copper matte is produced. The copper matte contains– **Sulphides of copper (I) and iron (II)**
- Heating pyrites to remove sulphur is called– **Roasting**
- In the blast furnace reactions takes place at temperature range of 900 – 1500 K–**$FeO + CO \rightarrow Fe + CO_2$**
- Copper obtained during extraction from cuprous oxide has blistered appearance due to– **The evolution of SO_2**
- ..... is concentrated by magnetic separation method– **Pyrolusite MnO_2, Chromite ore $FeO \cdot Cr_2O_3$, Magnetite Fe_3O_4**
- Serpeck's method involves the heating of bauxite with– **$N_2 + C$**
- ..... has the lowest percentage of carbon in it– **Wrought iron**
- The ..... is leached with NaCN– **Ore of Ag**
- The process in calcination– **Heating the ore in absence of air**
- The ores that are concentrated by Forth flotation method are– **Sulphides**
- In blast furnace, iron oxide is reduced by– **CO**
- The silver complex formed during cyanide process is– **$Na[Ag(CN)_2]$**
- Zincite and calamine respectively are– **Oxide and carbonate ore of Zn**
- ..... is chalcopyrite– **$CuFeS_2$**
- Cyanide process is used for the extraction of– **Au, Ag**
- ..... oxide is thermally least stable– **Ag_2O**
- The slag formed from P_2O_5 impurity in metallurgy of iron– **$Ca_3(PO_4)_2$**
- The ..... alloy containing a non-metal as a constituent in it– **Steel**
- ..... is a mineral of iron– **Magnetite**
- ..... elements is present as the impurity to the maximum extent in the pig iron– **Carbon**
- The ..... fused sodium chloride is electrolysed for extraction of sodium– **Down's process**
- Carborundum is– **SiC**
- The ..... sulphide when heated strongly in air gives the corresponding metal– **HgS**
- Most important ore of tin is– **Cassiterite**
- Sodium is extracted from– **NaCl**
- ..... contains both iron and copper– **Chalcopyrite**
- To dissolve argentite ore ..... is used– **NaCN**
- Iron obtained from blast furnace is– **Pig iron**
- ..... oxide is least stable– **CO_2**
- A substance reacts gangue to form fusible material is called– **Flux**
- Ellingham diagram are plots of ΔG° Vs T for the formation of– **Oxides, Halides, Sulphides**
- In Ellingham diagrams of $\Delta_f G$ oxide formation Vs T, ... graphs has negative slope– **$C \rightarrow CO$**
- The mineral contains calcium as well as magnesium– **Dolomite**

Search on TG: @apna_pdf

@apna_pdf

Electrochemical Principle of metallurgy and oxidation reduction

- In Bessemer converter Cu_2S is converted to blister copper by– **Self reduction**
- Extraction of gold and silver involves leaching the metal with CN^- ion. The metal is recovered by– **Displacement of metal by some other metal from the complex ion**
- In the Hall - Heroult process, aluminium is formed at the cathode. The cathode is made out of– **Carbon**
- In the metallurgy of aluminium– **Graphite anode is oxidised to carbon monoxide and carbon dioxide**
- ..... metal is used for extraction of Au and Ag and also for galvanisation of iron objects– **Zn**
- Used as reducing agent in Gold Schmidt method– **Al**
- ..... is used to reduce $TiCl_4$ to Ti– **Mg**
- Zinc is extracted from zinc blende by– **Carbon reduction process**
- Hall Heroult method is used for the extraction of– **Al**
- ..... gives metal by electrolytic reduction conveniently and profitably– **Al_2O_3**
- The metal can be extracted by self reduction process– **Pb, Hg, Cu**
- The metal can be extracted without using reducing agent– **Pb**
- The ..... metal is extracted using coke and carbon monoxide as reducing agent– **Fe**
- The ..... metal is extracted by the use of cyanide solution– **Ag**
- Electrolytic reduction method is used for extraction of– **Highly electropositive elements**
- If anode is made of nickel instead of graphite in the extraction of aluminium from $AlCl_3$– **Nickel will combine with Cl_2**
- When molten NaCl is electrolysed by using inert electrode, the product obtained at cathode is– **Na**
- ..... gives respective metal by self reduction– **Galena PbS, HgS**
- Aluminium is extracted from alumina (Al_2O_3) by electrolysis of a molten mixture of– **$Al_2O_3 + Na_3AlF_6 + CaF_2$**
- In the extraction of copper from its sulphide ore, the metal is finally obtained by the reduction of cuprous oxide with– **Copper (I) sulphide (Cu_2S)**
- Sulphides ores of metals are usually concentrated by Froth Floatation process, ... sulphides ores offers an exception and is concentrated by chemical leaching– **Argentite**
- In the extraction of chlorine from brine– **ΔG° for the overall reaction is positive**
  E° for the overall reaction has negative value

Refining and uses of Al, Cu, Zn, Fe

- Elements used as semiconductor are purified by– **Zone refining**
- Electrolytic refining is used to purity metals– **Cu and Zn**
- Poling is used for purification of metals having impurities of– **Metal oxides**
- Zone refining is based on the principle that– **Impurities are more soluble in molten metal than in solid metal**
- The method of zone refining of metals is based on the principle of– **Greater solubility of the impurity in molten state than in solid state**
- Impure zinc, as collected from earthen clay retort, is called– **Zinc spelter**
- German silver has– **70% silver, 95% silver, 46% silver**
- The most appropriate method for refining low boiling metals like zinc and mercury– **Distillation**
- Impure Ni + 4CO $\xrightarrow{(60-80)^\circ C}$ $Ni(CO)_4$ $\xrightarrow{100^\circ C}$ Ni + 4CO– **Mond process**
- Electrolytic refining is used to purify metals– **Cu and Zn**
- The ..... metal is purified by distillation process– **Zn**
- Vapour phase refining can be carried out in case of– **Ni, Zr, Ti**
- From gold amalgam, gold may be recovered by– **Distillation**
- The ..... pairs of metals is purified by Van Arkel method– **Zr and Ti**
- Bessemer converter is used for manufacture of– **Steel**
- Mond's process is used for– **Ni**
- ..... is used as depressant in the separation of mixture of PbS and ZnS– **NaCN**
- The inner layer of a blast furnace is made of– **Fireclay bricks**
- Pyrolusite is– **An oxide ore of Mn**
- Magnetite is a– **Fe_3O_4**
- Halide ore is a– **Carnallite**
- Carbonate ore is a– **Zincite**
- Removal of the unwanted materials like sand, clay, etc. from the ore is known as ....., ... or ..... **Concentration, dressing, benefaction**
- We separate two sulphide ores by froth floatation method is– **By adjusting proportion of oil to water or using depressant**
- Common impurities present in bauxite are– **SiO_2**
- Magnesium oxide is used for the lining in steel making furnace because– **MgO acts as a basic flux to remove impurities of Si, P and S**
- The metals is extracted using a silica lined convertor is **Cu**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

- Impurities of sulphur, silicon and phosphorus can– **Limestone changes impurities into oxides and pass into slag**
- The sulphides when heated strongly in air gives the corresponding metal without undergoing separate reduction of oxide– **HgS**
- The extraction of haematite, limestone is added acts as– **Flux**
- Wrought iron is manufactured from cast iron by heating it with– **Fe_2O_3**
- In blast furnace iron oxide is reduced by– **Carbon monoxide**
- In a thermite process ..... is used as reducing agent– **Al**
- In metallurgical process, aluminium acts as– **A reducing agent**
- The metals is obtained by electrolytic reduction process, is– **Al**
- Cryolite and fluorspar are mixed with Al_2O_3 during electrolysis for extraction of aluminium to– **Lower the melting point and increase the conductivity of the electrolyte**
- Extraction of chlorine from brine is based on– **Oxidation**
- ..... being highly reactive is used in the extraction of chromium and manganese– **Al**
- Most electropositive metals are obtained from their ores by– **Electrolysis of fused salts**
- Carnallite on electrolysis gives– **K and Cl_2**
- In electro-refining of copper, some gold is deposited as– **Anode**
- The process of electrolytic refining of copper, some metals present as impurity settle as 'anode mud'. These are– **Ag and Au**
- ..... is used as a method of purification for silicon– **Zone refining**
- Chromatography is a useful method for purification of elements which are– **Available in minute quantities**
- A number of elements are available in earth's crust but most abundant elements are– **Al and Fe**
- Zone refining is based on the principle that– **Impurities are more soluble in molten metal than in solid metal**
- Electrolytic refining is used to purify, the metals are– **Cu and Zn**
- The chemical reactions that represents Hall-Heroult Process– **$2Al_2O_3 + 3C \rightarrow 4Al + 3CO_2$**
- The methods that can be used to obtain highly pure metal is liquid at room temperature– **Distillation**
- The conversion of hydroxyapatite occurs due to presence of F^- ions in water. The formula of hydroxyapatite is– **$[3Ca_3(PO_4)_2\text{-}Ca(OH)_2]$**
- Cassiterite is an ore of– **Sn**
- The composition of 'copper matte' is– **$Cu_2S + FeS$**
- The extraction of which of the metals involves bessemerisation– **Cu**
- Extraction of gold and silver involves leaching with CN^- ion. Silver is later recovered by– **Displacement with Zn**

EXAM POINT

Occurrence of Metals

The metal extracted by leaching with a cyanide is–	**Ag**	**Karnataka CET-2017 BITSAT-2014, J&K CET-2003**
Siderite is–	**carbonate ore**	**COMEDK-2011, BCECE-2003**
In blast furnace, the highest temperature is in–	**combustion zone**	**Manipal-2020, CG PET-2015**
The process of zinc-plating on iron sheet is known as–	**galvanization**	**UPTU/UPSEE-2006, UP CPMT-2002**
Autoreduction process is used for the extraction of–	**Cu and Hg**	**CG PET-22.05.2022**
The chemical formula of carnallite–	**KCl. $MgCl_2.6H_2O$**	**TS EAMCET 10.08.2021, Shift-II**
Calamine, bauxite, malachite and siderite respectively are ores of–	**Zn, Al, Cu, Fe**	**AP EAMCET (Engg.) 18.9.2020 Shift-I**
Red hot iron absorbs SO_2 giving the product –	**FeO + FeS**	**Manipal-2019**
Formula of zincite is–	**ZnO**	**JCECE - 2018**

Search on TG: @apna_pdf

@apna_pdf

Percentage of carbon in pig iron is–	**4**	**JCECE - 2018**
The common impurity present in bauxite is–	**Fe_2O_3**	**Karnataka CET-2018**
Carborundum is the commercial name of–	**SiC**	**CG PET -2017**
The magnetite ore is–	**ferrous-ferric oxide**	**COMEDK-2015**
The most abundant element on earth is–	**Oxygen**	**MHT CET-2015**
Roasted copper pyrite on smelting with sand produces–	**$FeSiO_3$ as fusible slag and Cu_2S as matte**	**WB JEE-2015**
The formula of hematite is –	**Fe_2O_3**	**MPPET-2013**
In the extraction of Cu, the metal is formed in the bessemer converter due to the reaction–	**$Cu_2S + 2Cu_2O \rightarrow 6Cu + SO_2$**	
The chemical formula of feldspar is–	**$KAlSi_3O_8$**	**AP EAMCET (Engg.) -2007**
Chinnabar is an ore of–	**Hg**	**BITSAT-2009**
Heating pyrites to remove sulphur is called–	**roasting**	**CG PET -2005**
Cryolite is used in the electrolytic extraction of aluminium–	**to decompose bauxite**	**CG PET -2005**
The important ore of lead is–	**galena**	**CG PET -2005**
Wrought iron contains–	**C**	**J & K CET-2012**
The percentage of carbon in cast iron is–	**2.5 – 4.5**	**J & K CET-2009**
In the extraction of copper, the copper matte is mixture of–	**copper (I) sulphide and iron (II) sulphide**	**J & K CET-2010**
Metallic silver may be obtained from AgCl by–	**fusing it with Na_2CO_3**	**J & K CET-2008**
Calamine is–	**$ZnCO_3$**	**JCECE - 2006**
Cassiterite is concentrated by–	**electromagnetic separation**	**JCECE - 2014**

Extraction of crude metal from concentrated ore

Calcination is used in metallurgy for removal of –	**water and CO_2**	**Manipal-2020, CG PET-2015 BITSAT-2011**
Chemical structure/compostion of gangue being generated in the smelting process during Cu(metal) extraction is–	**$FeSiO_3$**	**Tripura JEE-2022**
The addition of silica during the extraction of copper from its sulphide ore converts–	**Iron oxide into iron silicate**	**JEE Main 2021, 27 July Shift –II**
The chemical that is added to reduce the melting point of the reaction mixture during the extraction of aluminium is–	**Cryolite**	**JEE Main 2021, 18 March Shift –I**
Cast iron is used for the manufacture of–	**Wrought iron and steel**	**JEE Main 2021, 2 Sep Shift –I**
The purest form of commercial iron is–	**wrought iron**	**JEE Main 2020, 7 Jan shift-I**
Copper is extracted from copper pyrites by–	**auto reduction**	**Karnataka CET-2020**
Copper matte is composed by –	**Cu_2S and FeS**	**AP EAMCET (Engg.) 17.09.2020 Shift-I**
The ore that contains both iron and copper is–	**Copper pyrites**	**JEE Main 2019, 9 Jan Shift-I**
Bassemerisation is used in the extraction of–	**copper**	**MHT CET-02.05.2019, SHIFT-III**
The most common method, used for extraction of metals from oxide ores involves–	**Reduction with carbon**	**Assam CEE-2018**
Extraction of chlorine from brine solution is based on–	**oxidation**	**Karnataka CET-2017**
Carborundum is obtained when silica is heated at high temperature with–	**carbon**	**JCECE - 2015**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

The chemical composition of slag formed during the smelting process in the extraction of copper is– **$FeSiO_3$**	**CG PET- 2013**
The catalyst and promoter respectively used in the Haber's process of industrial synthesis of ammonia are– **Fe, Mo**	**AP EAMCET (Engg.) - 2012**
Iron is extracted by– **pyrometallurgy**	**COMEDK-2011**
Hydrometallurgical process of extraction of metals is based on– **complex formation**	**COMEDK-2107**
Purification of alumina takes place by– **Hall's process**	**BCECE-2007**
Heating of ore in absence of air below its melting point is called– **Calcination**	**BCECE-2011**
The most electropositive metals are isolated from their ores by– **Electrolysis of fused ionic salts**	**BITSAT-2006**
Rusting on iron needs– **Air and water**	**CG PET -2006**
The common method of extraction of metals from oxide ores is– **Reduction with carbon**	**CG PET -2006**
The first step in the extraction of Cu from copper pyrites is– **Roasting of ore in O_2**	**J & K CET-2012**
The impurities associated with the ore after mining are collectively called– **Gangue**	**J & K CET-2013**
The process that involves the removal of sulphur from the ores is– **Roasting**	**JEE Main 16.03.2021, Shift-I**
During extraction of iron, the iron obtained at the bottom of blast furnace is known as– **Cast iron**	**J & K CET-2013**
The composition of malachite is– **$CuCO_3 \cdot Cu(OH)_2$**	**J & K CET-2007**
The most important ore of tin is– **cassiterite**	**JCECE - 2012**
Leaching is a process of– **concentration**	**JIPMER-2011**
When limestone is heated, CO_2 is given off. The metallurgical operation is– **calcination**	**Karnataka CET-2013**
The ore that is concentrated by the froth floatation process is– **chalcopyrites**	**Karnataka CET-2012**
The function of potassium ethyl xanthate in froth floatation process is to make the ore– **water repellent**	**Karnataka CET-2012**
In chromite ore, the oxidation number of iron and chromium are respectively.– **+2, + 3**	**Karnataka CET, 2010**
The froth-floatation process is based upon – **preferential wetting of gangue particles by oil**	**Kerala CEE-2005**
Limestone is used as a flux in the extraction of– **iron**	**MHT CET-2019**
Heating pyrites to remove sulphur is called:– **Roasting**	**HP CET-2018**
Autoreducation process is used in the extraction of– **Cu and Hg**	**UP CPMT-2011**
Reagent used to extract silver from Ag_2S is– **NaCN in presence of O_2**	**UP CPMT-2005**
Estimation of calcium and magnesium is done by– **EDTA**	**UPTU/UPSEE-2006**
The ore chromite is– **$FeCr_2O_4$**	**WB JEE-2013**

Thermodynamics principles of metallurgy

Bauxite is an ore of– **Al**	**COMEDK-2011, JCECE - 2007 JIPMER-2004, UP CPMT-2001**
The major components of German Silver are :– **Cu, Zn and Ni**	**JEE Main 25.02.2021, Shift-II GUJCET-2011 UP CPMT-2009**

Search on TG: @apna_pdf

@apna_pdf

In blast furnace, iron oxide is reduced by–	**CO**	**CG PET- 2010**
Ellingham diagram is a graphical representation of–	**ΔG vs T**	**JEE Main 2021,25 Feb Shift – I** **JEE main -2020**
The temperature of the slag zone in the metallurgy of iron using blast furnace is–	**800 – 1000°C**	**Karnataka CET, 2009**
The iron obtained from blast furnace is–	**pig iron**	**CG PET -2005**
For the dissociation of limestone in the slag zone of the blast furnace, the reaction is–	**endothermic accompanied by increase in entropy**	**COMEDK-2012**
In metallurgy of iron when limestone is added to blast furnace calcium ion ends up in–	**Slag**	**MPPET-2013**
In the metallurgy of iron, when limestone is added to the blast furnace, the calcium ions are removed as–	**slag**	**CG PET- 2015**
Thermite mixture used for welding is–	**ferric oxide and aluminium powder**	**BCECE-2016**
In metallurgical process of a aluminium, cryolite is mixed with alumina in its molten state, because it–	**decreases the melting point of alumina.**	**AIIMS-2011**
With respect to an ore, Ellingham diagram helps to predict the feasibility of its–	**thermal reduction**	**(JEE Main 2019, 9 April Shift-I)**
The process involves smelting is–	**$Fe_2O_3 + 2CO \longrightarrow 2Fe + 2CO_2$**	**BCECE-2017**
Elektron is an alloy of:–	**Mg+Zn**	**WB JEE-2009** **AP EAMCET (Med.)-1999** **AP EAMCET (Medical) - 1998**
Thermite is a mixture of iron oxide and–	**Aluminium powder**	**BCECE-2010** **AIIMS-2002** **AP EAMCET- 1994**
Gun metal is an alloy of –	**Cu, Sn and Zn**	**AP EAMCET (Engg.)-2004** **JIPMER-1996**
Brass is an alloy of–	**Cu and Zn**	**CG PET -2007, 2004** **AP.EAMCET-1993, 2000**
Philosopher's wool on heating with BaO at 1100°C produces –	**$BaZnO_2$**	**UPTU/UPSEE-2006** **AIIMS-2001** **AIIMS-2000**
Mischmetal is an alloy of –	**Lanthanide, iron and carbon**	**JEE Main-2020** **COMEDK-2016** **BCECE-2013**
Bronze is a mixture of–	**Cu+Sn**	**UPTU/UPSEE-2006** **UP CPMT-2002**
The alloy, which contains 95% aluminium and small, amounts of copper, magnesium and manganese is–	**duralumin**	**AP EAMCET (Engg.) 17.09.2020, Shift-II**
In the extraction of silver, zinc metal is used as reducing agent. The molecular structure of the zinc complex formed in this reaction is–	**Tetrahedral**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
The alloy used in the construction of aircrafts is–	**Mg-Al**	**(JEE Main 2019, 10 April Shift –II)**
Glass is–	**super cooled liquid**	**JCECE - 2017**
Sterling silver is–	**Alloy of 80% Ag + 20% Cu**	**VITEEE- 2010**
In the production of iron from haematite, the limestone acts as–	**flux**	**Assam CEE-2014**
Solder is an alloy of lead with –	**tin**	**BCECE-2006**
Aluminium bronze has–	**90% Cu**	**BCECE-2009**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

The alloy best suited for making meter scales is–	**invar**	**BCECE-2011**
Stainless steel contains–	**Fe + Cr + Ni**	**BCECE-2010, AIPMT-1995**
Percentage of silver in the alloy 'german silver' is–	**Zero%**	**BITSAT-2008, JIPMER-2003**
The ore that is concentrated by froth floatation process is–	**cinnabar**	**Karnataka CET, 2009**
Willemite is–	**Zn_2SiO_4**	**MHT CET-2009**
Bell metal is an alloy of–	**Cu + Sn**	**AIPMT-1999 AIPMT -1999**
Gravity separation process is used for the concentration of–	**haematite**	**Uttarakhand PMT-2009 UP CPMT-2003**
The formula of haematite is–	**Fe_2O_3**	**UPTU/UPSEE-2010**
Alloy is an example of–	**solid solution**	**UPTU/UPSEE-2008**

Electrochemistry principle of metallurgy and oxidation reduction

In the extraction of sodium by Downs' process cathode and anode are respectively– **Iron and graphite**	**AP EAMCET- 2004, 2002**
The maximum temperature that can be achieved in blast furnace is– **upto 2200 K**	**NEET-2021**
In the purification of impure nickel by Mond's process, metal is purified by:– **Vapour phase thermal decomposition**	**BITSAT-2019**
Electrometallurgical process is used to extract– **Na**	**BITSAT-2017**
An optically inactive racemic form can be separated into two active forms. This process is called– **resolution of the racemic mixture.**	**SRMJEEE – 2016**
In the metallurgy of aluminium when the fused matrix is electrolyzed, the overall reduction reaction is– $2Al_2O_3 + 3C \longrightarrow 4Al + 3CO_2$	**COMEDK-2015**
In the metallurgy of zinc, the reducing agent employed in reducing the zinc oxide to crude zinc metal in the last stage is– **Coke**	**Kerala CEE-2015**
The basic chemical reaction that is used in the commercial extraction of zinc involves the reduction of ZnO with– **CO**	**SCRA-2012**
The product obtained at anode when 50% H_2SO_4 aqueous solution is electrolyzed using platinum electrodes is– **$H_2S_2O_8$**	**AP EAMCET- 2003**
During the electrolysis of cryolite, aluminium and fluorine are formed in molar ratio– **2:3**	AP **EAMCET-2003**
The electrolyte used in Castner's process of sodium extraction is– **fused anhydrous NaOH**	**AP EAMCET (Engg.)-2004**
In the extraction of copper from its sulphide ore, the metal is formed by reduction of Cu_2O with– **Cu_2S**	**AIIMS-2003**
During roasting, copper pyrites is converted to– **$Cu_2S + FeS$**	**Assam CEE-2014**
Silver containing lead as an impurity is removed by– **cupellation**	**BITSAT-2008**
The formula of siderite is– **$FeCO_3$**	**J & K CET- 2011**
The auto reduction process is not used in the metallurgy of– **Fe**	**J & K CET-2009**
The metallurgical process in which a metal is obtained in a fused state is called– **smelting**	**J & K CET-2008**
During the extraction of copper, the impurity (Fe) is removed as slag by mixing the contaminated copper ore with silica and coke. The molecular formula of slag is– **$FeSiO_3$**	**J & K CET-2006**
The form of iron having the highest carbon content is– **Cast iron**	**J & K CET-2005 JCE CE-2014**
Certain crystals produce electric signals on application pressure. This phenomenon is called– **Piezoelectricity**	**JIPMER-2006**
In metallurgy, flux is a substance used to convert– **infusible impurities to fusible impurities**	**UP CPMT-2013**

Search on TG: @apna_pdf

@apna_pdf

Iron pipes, lying in acidic soil, are often attached to the blocks of magnesium for their protection from rusting, because magnesium– **is more readily converted into positive ion**	**UPTU/UPSEE-2012**
Thermite process is used in reduction of– **Al_2O_3**	**UPTU/UPSEE-2009**

Refining and uses of Al, Cu, Zn, Fe

Aluminium metal is refined by– **Hoope's process**	**Kerala CEE-2017, MHT CET-2012 MPPET-2008, BCECE-2005**
The processes used in the refining of aluminium and zinc metals are respectively– **Hoope's process and fractional distillation**	**AP EAMCET(Medical) - 2010 AIPMT -1999**
Semiconductors of very high purity are obtained by– **Zone refining**	**BITSAT-2015, COMEDK-2014**
The method of zone refining of metals is based on the principle of– **Greater solubility of the impurity in the molten state than in the solid.**	**UPTU/UPSEE-2007 (AIPMT -2003)**
The role of depressants in 'Froth Flotation Method' is to– **Selectively prevent one component of the ore from coming to the froth**	**JEE Main-26.06.2022, Shift-II**
o-nitrophenol & p-nitrophenol are separated by– **Steam distillation**	**AP EAPCET- 07-09-2021, Shift-I AP EAMCET (Medical) - 2006**
The method used for the purification of indium is– **zone refining**	**JEE Main-2021, 25 Feb Shift-II**
The metal that can be purified economically by fractional distillation method is– **Zn**	**JEE Main-2021, 20 July Shift-I**
Boron and silicon of very high purity can be obtained through– **Zone refining**	**JEE Main-2020, 5 Sep Shift-II**
The element that can be refined by distillation is– **Zinc**	**JEE Main-2020, 6 Sep Shift-II**
The refining method used when the metal and the impurities have low and high melting temperatures, respectively, is– **Liquation**	**JEE Main-2020, 7 Jan Shift-II**
The Process of calcination and roasting in metallurgical industries, respectively, can lead to– **Global warming and acid rain**	**JEE Main-2020, 4 Sep Shift-II**
A miscible mixture of C_6H_6+$CHCl_3$ can be separated by– **Distillation**	**COMEDK-2019**
The Mond process is used for the– **Purification of Ni**	**JEE Main-2019, 8 April Shift-II**
Anthracene is purified by– **Sublimation**	**HP CET-2018**
Petroleum refining involves– **Fractional distillation**	**UPTU/UPSEE-2018**
Van-Arkel method of refining zirconium involves– **Removing all oxygen and nitrogen impurities**	**Karnataka CET-2016**
Carbon monoxide forms volatile compound with– **Ni**	**COMEDK-2015**
The chemical reaction that involves roasting process is– $2ZnS + 3O_2 \longrightarrow 2ZnO + 3SO_2$	**AP EAMCET- (Engg.) - 2010**
During the process of electrolytic refining of copper, some metals present as impurity settle as 'anode mud'. These are– **Ag and Au**	**(AIEEE-2005)**
Magnalium contains– **Mg + Al**	**JCECE - 2007**
The process of zone refining is used in the purification of– **Ge**	**Karnataka CET-2013**
In the electrolytic refining of zinc the electrolyte is – **acidified zinc sulphate**	**Karnataka CET, 2010**
In electro refining of copper, some gold is deposited as– **anode mud**	**UPTU/UPSEE-2006**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

20. ORGANIC CHEMISTRY
Some Basic Principles and Techniques

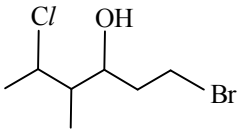
Classification and Nomenclature

■ IUPAC name of $(CH_3)_3C - CH = CH_2$ is–
3,3-dimethylbut - 1 - ene

■ 3-methylpenta-1, 3-diene represents–
$CH_3CH = C(CH_3)CH = CH_2$

■ The correct decreasing order of priority for the functional groups of organic compounds in the IUPAC system of nomenclature is–
–COOH, $–SO_3H$, $–CONH_2$, –CHO

■ The correct IUPAC name of the compound is–



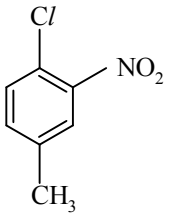
1-bromo-4-methyl-5-chlorohexan-3-ol

■ The correct IUPAC name is–
3-Ethyl-4, 4-dimethylheptane

■ The IUPAC name for

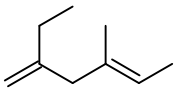
4-Oxopentanoic acid

■ The IUPAC name for–

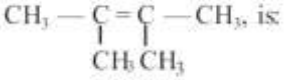


1-Chloro-4-methyl-2-nitrobenzene

■ The correct structure of 2-Ethyl 4-Methyl hexa, 1, 4-diene–



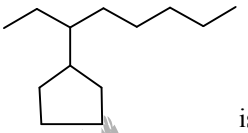
■ The correct IUPAC name of



2, 3-dimethyl but-2-ene

■ IUPAC name of $CH \equiv C - CH = CH_2$ is–
But-1-ene-3-yne

■ The IUPAC name of the given compound

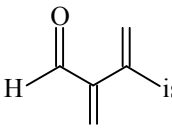


is– **3-cyclopentyl octane**

■ IUPAC name of the compound is–

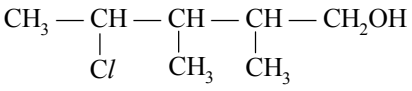
3-(2-bromo cyclopentyl)-6-methyl cyclohex-1-ene

■ The represent correct pair(s) of homologous–
Me – OH & $MeCH_2CH_2OH$

■  is named as–

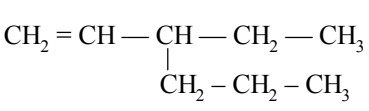
3-Methyl-2-methlenebut-3-enal

■ The correct IUPAC name of the organic compound



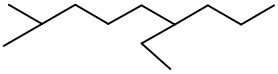
4-Chloro-2, 3-dimethyl pentan-1-ol

■ The IUPAC name of



3-Ethyl hex-1-ene

■ For the given alkane,

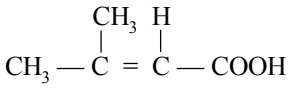


The IUPAC name is– **6-Ethyl 2-methyl nonane**

■ The IUPAC name of CH_3COCH_3 is– **2-Propanone**

Search on TG: @apna_pdf
@apna_pdf

- IUPAC name of the given compound is–

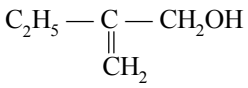


3-Methyl but-2-enoic acid

- IUPAC name of $(CH_3)_3\ CCl$ is–

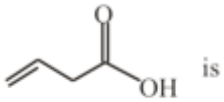
2-Chloro-2-methyl propane

- The IUPAC name o the compound–



2-ethyl prop-2-en-1-ol

- The IUPAC name of–



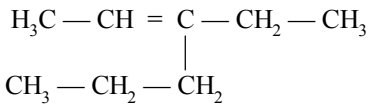
is

But-3-enoic acid

- The IUPAC name of tertiary butyl iodide is–

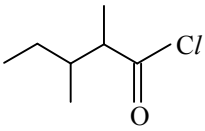
2-Iodo-2-methy propane

- Correct IUPAC name is–



3-ethyl hex-2-ene

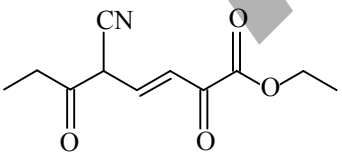
- The IUPAC name is–



is

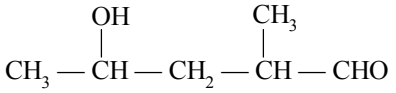
2, 3 -dimethyl pentanoyl chloride

- The IUPAC name for the hydrocarbon represented by swatik sign is– **3, 3-diethyl pentane**
- I.U.P.A.C. name of



Ethyl 5-cyano-2-6-dioxo-oct-3-en-1-oate

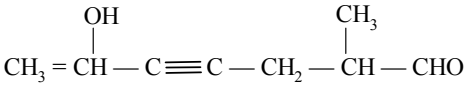
- According to Huckel's rule a compound is said to be aromatic if it contains– **(4n + 2) π electrons**
- The IUPAC name of



is–

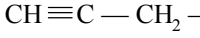
4-Hydroxy-2-methylpentanal

- Formula of phenyl carbinol and chloral are respectively– **$C_6H_5CH_2OH$ and CCl_3CHO**
- In the molecule how many carbon atoms arrange linearly–

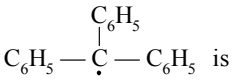


4

- In the molecule the bond strength of carbon-carbon bond is maximum is– **HC ≡ CH**
- Propargyl alcohol has sum of no of σ, π bonds & lp:



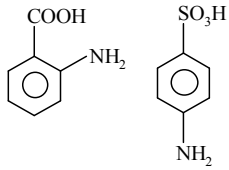
11

- 

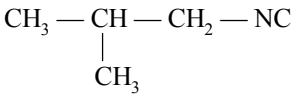
is

Trityl radical

- Structure of Anthranilic & sulfanilic acid are represented by–

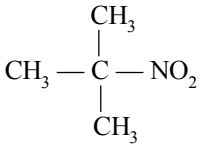


- The structure of isobutyl isonitrile is–

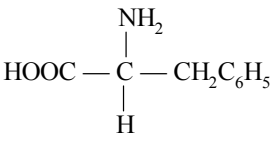


Isomerism

- The minimum number of carbon atoms of an alkane must have to form an isomer is– **4**
- l-Butene and cyclobutane show– **Ring-chain isomerism**
- An isomer of ethanol is– **Dimethylether**
- The compound isomeric with 2, 2, 4, 4-tetramethylhexane is– **4-isopropylheptane**
- The compounds shows metamerism is– **$C_5H_{10}O$**
- The functional group isomerism is not possible?– **Alkyl halides**
- Primary, secondary and tertiary amines are– **Functional isomers**
- The compounds does not show tautomerism–



- The compound would exhibit optical isomerism?–

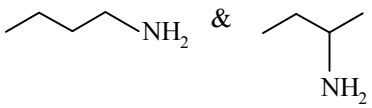


TEAM SPY

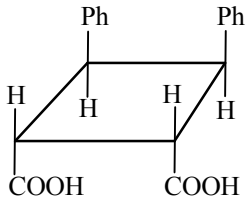
Search on TG: @apna_pdf

@apna_pdf

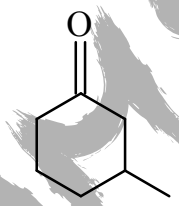
- The position isomer is



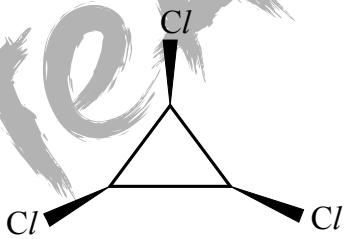
- The total number of benzene derivatives having the molecular formula C_7H_7Cl are– **4**
- In the given functional groups, the correct arrangement of priority is–
  –COOH > –CHO > R –CO–R > –OH
- The species exhibits a plane of symmetry?–



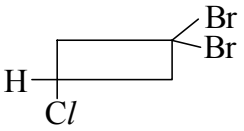
- Number of structurally isomeric carbonyl compounds possible with molecular formula $C_5H_{10}O$ are– **7**
- The carbonyl compound on reacting with NH_2OH (hydroxylamine) give product that can show G.I.?–



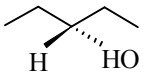
- The compounds has a zero dipole moment?–



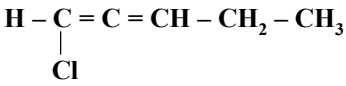
- The compounds can not show Geometrical Isomerism is–



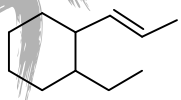
- Methoxy methane and ethanol are–
  Functional isomers
- The exhibit geometrical isomerism–
  1-phenyl-2-butene
- Different structures generated due to rotation about, C– C axis, of an organic molecule, are the examples of– **Conformational isomerism**
- The compound exhibits geometrical isomerism?–
  $CH_3CH = CH – CH_3$
- The molecules is achiral–



- Optical isomerism is shown by– **butan-2-ol**
- The type of isomerism observed in urea molecule is– **Tautomerism**
- Optical isomerism arise from the presence of–
  An asymmetric carbon atom
- The number of isomeric ethers with molecular formula $C_4H_{10}O$ are– **Three**
- The alkenes does not exhibit geometric isomerism is– **C_3H_6**
- The number of optical isomers of 2, 3-dihydroxy butanal is/are– **Four**
- The chiral is.



- Number of Geometrical isomers in given compound–



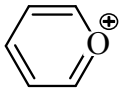
2

- α-hydroxy propanoic acid has asymmetric carbon atoms– **4**
- How many isomeric vicinal-dihalides are possible for the compound having molecular formula $C_3H_6Cl_2$?– **1**
- The most stable comformation of n-butane is– **Skew**
- Number of possible position isomers for dichlorobenzene is– **2**
- Alkanols and Alkoxyalkanes are–
  Functional isomers
- n-Propyl alcohol and isopropyl alcohol are examples of– **Position isomerism**
- The number of structural alcoholic isomers for $C_4H_{10}O$ is– **4**
- Number of possible structures of monochlorobenzene is– **1**
- The total number of structural isomers for the compound of the formula $C_4H_{10}O$ is– **7**
- The compound which is not isomeric with diethyl ether is– **Butanone**
- The type of isomerism exhibited by the compound with formula $C_5H_{12}O$ is– **Chain, Position, Functional & Metamerism**
- The total no. of structural isomers of $C_3H_6Br_2$– **4**
- The total number of structural isomers of C_3H_6ClBr– **5**

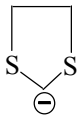
Search on TG: @apna_pdf
@apna_pdf

Fundamental Concepts of Organic Reactions

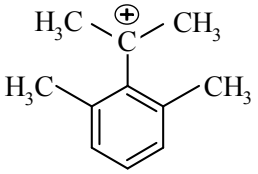
- Heterolysis of a carbon-chlorine bond produces– **One cation and one anion**
- The intermediates contains three pairs of electrons in its valence shell– **Carbocations**
- Inductive effect involves displacement of- **σ-electrons resulting in polarisation**
- The increasing order of electron donating inductive effect of alkyl groups is– **$-H < -CH_3 < -C_2H_5 < -C_3H_7$**
- Inductive effect of which atom is taken as zero to compare inductive effect of other atoms– **Hydrogen**
- Hyperconjugation is– **σ-π conjugation, no bond resonance**
- Stability of iso-butylene can be best explained by– **Hyperconjugative effect**
- Stability of alkyl carbocations can be explained by– **Both inductive effect and hyperconjugation**
- The carbocation $CH_3C^+HCH_3$ is less stable than– **$(CH_3)_3\overset{+}{C}$**
- Free radicals can undergo rearrangement to a more stable free radical, decomposition to give- **another free radical**
- Characteristic feature of a free radical is – **An unpaired electron**
- Separation of two substances by crystallisation depends upon their differences in– **Solubility**
- Those substances can be separated by steam distillation are steam volatile and – **Insoluble in water**
- The molecules represents the order of hybridisation sp^2, sp^2, sp, sp from left to right atoms- **$CH_2 = CH - C \equiv CH$**
- The correct with respect to –I effect of the substituents? (R = alkyl) **$-NH_2 < -OR < -F$, $-NR_2 < -OR < -F$**
- Vital Force Theory was proposed by– **Berzelius**
- Total σ and π bonds are present in $CH_2 = CH - CH = CH - CH_3$ **12σ and 2π**
- The hybridisation of carbons of C–C single bond of $HC \equiv C - CH = CH_2$ is– **$sp - sp^2$**
- A tertiary butyl carbocation is more stable than a secondary butyl carbocation because of **–Hyperconjugation**
- The compounds the carbon marked with asterisk is expected to have greatest positive charge?– **$\dot{C}H_3 - CH_2 - Cl$**
- Resonance stabilized cation is–



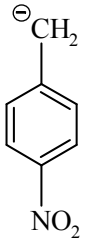
- The carbanion is resonance stabilised–



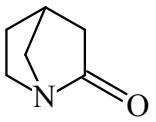
- The extra bond will be formed in its resonating structures is– $H_3C - \overset{\oplus}{C}H - OCH_3$
- The carbocation is not resonance stabilised–



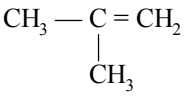
- The carbanion is maximum stable–



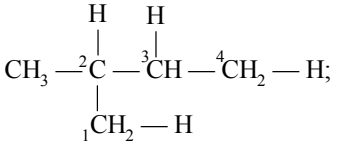
- In the compound, lone pair of N is not involved in resonance–



- In pyridine; Number of conjugated electron are– 6
- The molecules has longest C = C length–



-



$C_1 - H$, $C_2 - H$, $C_3 - H$ and $C_4 - H$ the homolytic bond dissociation energy is in the order–

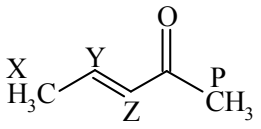
$C_1 - H > C_4 - H > C_3 - H > C_2 - H$

TEAM SPY

Search on TG: @apna_pdf

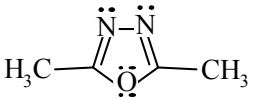
@apna_pdf

- The abstraction of proton will be fastest in carbon in the compound

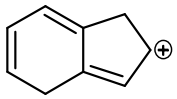


X

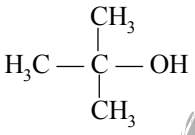
- An aromatic compound–

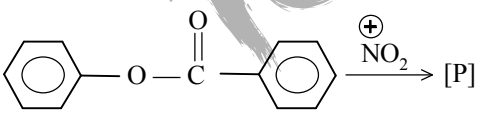


- The carbocation is the most stabilized–

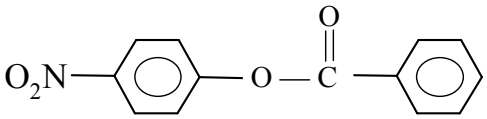


- The compound which gives the most stable carbonium ion on dehydration–

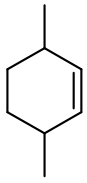


- Heterolysis of propane gives–
  Methyl anion and ethyl carbocation
- $CH_4 + Cl_2 \xrightarrow{hv} CH_3Cl + HCl$ is an example for–
  Free radical substitution reaction
- An electrophilic reagent is. **NO_2^+**
- The reaction intermediate carbenes are produced from– **Diazomethane, Ketene, $CHCl_3/C_2H_5ONa$**
- The hybridised state of carbon exerts strongest-I effect having how much percentage of 's' character?– **50%**
- 

The product [P] is–



- The presence of Chlorine atom on benzene ring makes the second substituent enter at position–
  Ortho & para
- The most negative heat of hydrogenation?–



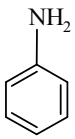
Methods of Purification of Organic Compounds

- Glycerine can be purified by– **Vacuum distillation**
- Distillation under reduced pressure is generally used to purify those liquids which–
  Have high boiling points and which decompose below their boiling points
- The method that can be applied to separate a mixture of camphor and benzoic acid–
  Chemical methods
- The substance that can be used as adsorbent in column chromatography is– **Al_2O_3**
- The presence of carbon in an organic compound can be shown by–
  Heating the compound with cupric oxide
- A liquid compound (x) can be purified by steam distillation only if it is– **Steam volatile, immiscible with water**
- Paper chromatography is–
  Partition chromatography
- The principle involved in paper chromatography is–
  Partition
- Separate a solution (miscible) of benzene and $CHCl_3$?– **Distillation**
- The methods can be used to separate a mixture of ortho and para-nitrophenols– **Steam distillation**
- The is purified by steam distillation?– **Aniline**
- Sublimation is a process in a solid–
  Changes into vapour form solid
- A mixture of camphor and benzoic acid can be separated by– **Sublimation**
- The best method for the separation of naphthalene and benzoic acid from their mixture is–**Sublimation**
- For the purification, isolation and separation of organic compounds, the latest technique followed is– **Chromatography**
- The reagents will be fruitful for separation of a mixture of nitrobenzene and aniline?–**Aqueous HCl**
- A liquid which decomposes at its boiling point can be purified by– **Distillation under reduced pressure**
- Turpentine oil can be purified by– **Steam distillation**
- Vacuum distillation is used to purify liquids which–
  Decomposes below their B.P's
- Impure Naphtalene is purified by– **Sublimation**
- A mixture of camphor and KCl can be separated by– **Sublimation**
- In steam distillation, the sum of the vapour pressure of the volatile compound and that of water is–
  Equal to atmospheric pressure

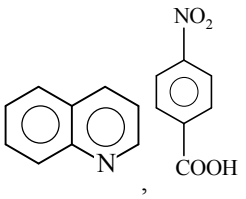
TEAPSY
Search on TG: @apna_pdf
@apna_pdf

Qualitative Analysis of Organic Compounds

- In Lassaigne's test for N, S and halogens, the organic compound is– **Fused with sodium**
- The blue compound formed in the positive test for nitrogen with Lassaigne solution of an organic compound is– **$Fe_4[Fe(CN)_6]_3 \cdot xH_2O$**
- If on adding $FeCl_3$ solution to acidified Lassaigne solution, a blood red colouration is produced, it indicates the presence of– **N and S**
- During sodium extract preparation for Lassaigne's test both N and S present in organic compound change to– **NaSCN**
- Freshly prepared solution of sodium nitroprusside is added to the sodium extract. Appearance of a deep violet colour indicates the presence of– **Sulphur**
- 0.92 g of an organic compound was analysed by combustion method. The mass of the U-tube increased by 1.08 g. The percentage of hydrogen in the compound is– **13.04%**
- Paper chromatography is an example of– **Partition chromatography**
- Phenol on reaction with dilute nitric acid, gives two products. The most efficient for large scale separation, the method will be– **Steam distillation**
- Compound is added to the sodium extract before addition of silver nitrate for testing of halogens– **Nitric acid**
- A tertiary butyl carbocation is more stable than a secondary butyl carbocation due to – **Hyperconjugation**
- The number of sigma (σ) and pi (π) bonds in pent-2-en-4-yne is– **10 σ bonds and 3 π bonds**
- An organic compound is estimated through Dumas method and was found to evolve 6 moles of CO_2, 4 moles of H_2O and 1 mole of nitrogen gas. The formula of the compound is– **$C_6H_8N_2$**
- The Kjeldahl's method for the estimation of mitrogen can be used to estimate the amount of nitrogen in compounds–



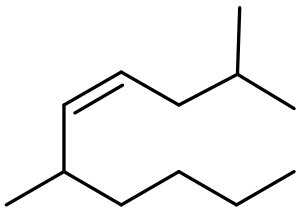
- Lassaigne's test in qualitative analysis is used to detect– **Nitrogen, Sulphur, Chlorine**
- The compound formed in the positive test for nitrogen with the Lassaigne solution of an organic compound is– **$Fe_4[Fe(CN_6)]_3$**
- Lassaigne's test is not used for the detection of– **Carbon**
- During Lassaigne's test, N and S present in a organic compound change into– **NaCNS**
- Presence of halogen in organic compounds can be detected by using– **Beilstein test**
- In an organic compound, phosphorus is estimated as– **$Mg_2P_2O_7$**
- During the fusion of an organic compound with sodium metal, nitrogen of the compound is converted into– **NaCN**
- Presence of nitrogen in compounds can bot be detected by Lassaigne's method?– **Hydrazine**
- Violet coloured complex obtained in the detection of sulphur is– **$Na_4[Fe(CN)_5NOS]$**
- In Lassaigne's method organic compound is fused with– **Sodium metal**
- Medium of sodium extract is– **Basic**
- In the Lassaigne's test the sulphur present in the organic compound first changes into– **Na_2S**
- A mixture of calcium sulphate and comphor can be separated by– **Sublimation**
- A compound does not give a positive result in the Lassaigne's test for nitrogen is– **$NH_2OH.HCl$**
- Sodium extract gives blood red colour when treated with $FeCl_3$. Formation of blood red colour confirms the presence of– **Both Nitrogen and Sulphur**
- The compounds will give Lassaigne's test for nitrogen– **NaCN**
- The methods is not used for estimation of nitro and azo compounds– **Kjeldahl's method**
- 4 g of hydrocarbon (C_xH_y) on complete combustion gave 12 g of CO_2. What is the empirical formula of the hydrocarbon– **C_3H_8**
- An unknown compound has molecular mass 240g/mol. If empirical formula is CH_2O then its molecular formula will be– **$C_8H_{16}O_8$**
- The estimated by Liebig method is **C and H**
- In Carius method halogens are estimate as– **AgX**
- In Duma's method nitrogen in organic compound is estimated in the form of– **N_2**
- In organic compounds, sulphur is estimated as– **$BaSO_4$**
- Kjeldahl's method cannot be used for the estimation of nitrogen in– **$C_6H_5 - N = N - C_6H_5$,**



,

TEAM SPY
Search on TG: @apna_pdf
@apna_pdf

- In Kjeldahl's method, nitrogen present in the organic compound is first converted into– **$(NH_4)_2SO_4$**
- The gas is introduced into the combustion tube in Liebig's method?– **Pure and dry O_2**
- If two compounds have the same emperical formula but different molecular formula they must have– **Different molecular weight**
- In dumas method 0.5 g of an organic compound containing nitrogen gave 112 ml of nitrogen at S.T.P. The percentage of nitrogen into the given compound is– **28**
- The correct structure of 2, 6-Dimethyl-dec-4-ene is–



- Paper chromatography is an example of– **– Partition chromatography**

EXAM POINT

Classification and nomenclature

A compound with a molecular formula of C_6H_{14} has two tertiary carbons. Its IUPAC name is- **2,3-dimethylbutane**	**NEET-05.05.2024**
The IUPAC name of ethylidene chloride is – **1,1-Dichloroethane**	**JEE Main-25.06.2022, Shift-I**
The functional groups present in 'salol' are – **–OH and –COOR**	**A.P.EAMCET/2007**
Hexa – 2ene –4 –yne is– **CH_3–C ≡ C–CH – CH_3**	**MPPET- 2009**
Hex-1-yne on reaction with Br_2 (excess)/CCl_4, gives– **1, 1, 2, 2 – Tetrabromohexane**	**TS-EAMCET (Engg.), 05.08.2021 Shift-II**
The common name of isopropyl benzene is– **Cumene**	**AP EAMCET (Engg.) 21.09.2020, Shift-II**
The IUPAC name of the compound $(CH_3)_2CH–CH=CH–CHOH–CH_3$ is– **5-methyl-hex-3-en-2-ol**	**AP EAMCET (Engg.) -2007**
The IUPAC name of tertiary butyl chloride is– **2-chloro-2-methylpropane**	**COMEDK 2014**
The structure of 4-bromo-3-methylbut-1-ene is– **CH_2=CH-CH(CH_3)-CH_2Br**	**(AIIMS-2008)**
The IUPAC name of Diacetone alcohol is– **4 - Hydroxy -4 - methyl pentan - 2- one**	**AP EAPCET 19-08-2021, Shift-II**
IUPAC name of valeric acid is– **Pentanoic acid**	**VITEEE-2016**
The IUPAC name of the compound $CH_3CH = CHC ≡ CH$ is– **pent-3-en-1-yne**	**VITEEE- 2012**
The IUPAC name of $CH_3–CH_2–COO–COCH_3$ is- **Ethanoic propanoic anhydride**	**SRMJEEE – 2014**
IUPAC name of $(CH_3)_3C – CH = CH_2$ is– **3,3- dimethylbut-1-ene**	**AMU-2017 Kerala CEE-2015**
The IUPAC name of $CH_3CHOHCH_2CH(CH_3)CHO$ is– **4-hydroxy -2-methylpentanal**	**AMU-2012 Assam CEE-2014**
The IUPAC name of $CH_3CONHBr$ is– **N–bromoethanamide**	**AMU – 2008**
t-butyl alcohol is– **2-methyl propan-2-ol**	**BCECE-2008**
I.U.P.A.C. name of $(CH_3)_2$ N–C_2H_5 is – **N, N dimethyl amino ethane**	**MPPET - 2012**
The IUPAC name of tartaric acid is– **2, 3-dihydroxybutane-1, 4-dioic acid**	**BCECE-2014**
IUPAC name of $CH_3CH(CH_3)$ COOH is– **2 - Methylpropanoic acid**	**[BITSAT- 2008]**
IUPAC name of lowest molecular mass alkane containing chiral carbon is– **3-methylhexane**	**CG PET -2019**
The IUPAC name of crotonaldehyde is– **but-2-en-1-al**	**CG PET -2005, MHT CET-2009**

Search on TG: @apna_pdf

@apna_pdf

The IUPAC name of $CH_3COCH_2CH_2CH_3$ is –	**2- Pentanone**	**HP CET-2018**
Mesityl oxide is a common name of–	**4-methyl pent -3-ene-2-one**	**[JEE Main 2021, 17 March Shift-I]**
The IUPAC name of neopentane is–	**2,2-dimethylpropane**	**AIEEE 2009**
IUPAC name of m-cresol is–	**3-methyl phenol**	**JCECE - 2013**
The IUPAC name of acryldehdye is–	**Prop-2-ene-1-al**	**JIPMER-2012 Kerala CEE-2005**
The IUPAC name for methyl salicylate–	**Methyl-2- hydroxyl benzoate**	**GUJCET-2019**
2, 2-dichloro propane on hydrolysis yields–	**acetone**	**MHT CET-2007**
The IUPAC name of the compound having the formula $CH \equiv C - CH = CH_2$ is–	**1-butene-3-yne**	**AIPMT -2009**
1, 2 – dihydroxybutane has the formula–	**C(OH)–C(OH)–C–C**	**UP CPMT-2007**
The IUPAC name of the compound $CH_3 - CH(CH_3) - CO - CH_3$ is–	**3-methyl-2-butanone**	**UPTU/UPSEE-2018**

Isomerism

Two isomers 'A' and 'B' with molecular formula C_4H_8 give different products on oxidation with $KMnO_4$ in acidic medium, Isomer 'A' on reaction with $KMnO_4/H^+$ results in effervescence of a gas and gives ketone. The compound 'A' is:– **2-methyl propene**	**JEE Main-29.06.2022, Shift-I**
No. of structural isomers a possible for C_4H_9Br are– **4**	**CG PET-22.05.2022**
n-butylchloride, sec-butylchloride, iso- butylchloride and tert-butylchloride are examples of– **Structural isomers**	**SCRA-2015**
According to Cahn–Ingold-Prelog sequence rules, the correct order of priority for the given groups is– **–OH>–COOH>–CHO>–CH_2OH**	**AP EAMCET-2008**
For a molecular formula of C_6H_{10} of an alkyne series, the number of possible branched isomers is– **4**	**TS-EAMCET (Engg.), 07.08.2021 Shift-II**
The number of optical isomers possible for 2-Bromo 3- chloro butane are– **4**	**AP EAPCET 19-08-2021 Shift-I**
An optically inactive natural α-amino acid is– **Glycine**	**SCRA 2012**
Different conformations of the same molecule are called– **Rotamers**	**AP EAMCET (Engg.) 2012**
An organic compound is optically active if it– **is non-super imposable on its mirror image.**	**COMEDK-2012**
Methoxymethane and ethanol exhibit– **Functional isomerism**	**COMEDK 2011**
Maleic acid and fumaric acid are– **geometrical**	**BITSAT-2020, COMEDK 2014 VITEEE-2008**
Ammonia gas does not evolve from the complex $FeCl_3.4NH_3$ but it gives white precipitate with aqueous solution of $AgNO_3$. Co-ordination number of central metal ion in above complex is six. IUPAC name of the complex.– **Dichloro tetra ammine ferrum (III) chloride.**	**GUJCET-2011**
The number of racemic mixture obtained by optical isomers of 2,3-dihydroxy butanal is/are:– **Two**	**GUJCET-2007**
A molecule having 3 different chiral carbon atoms, then number of stereo-isomers it will have – **8**	**GUJCET-2008**
Metamerism can be exhibited by the compounds containing– **Bivalent functional group**	**TS-EAMCET (Engg.), 06.08.2021**
The compound CHCl= CHCHOHCOOH with molecular formula $C_4H_5O_3Cl$ can exhibit– **Geometric, optical, position and functional isomerism.**	**(AIIMS-2014)**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

Spin isomerism is shown by– **hydrogen**	**(AIIMS-2008)**
Meso-form can be obtained in– **2, 3-dichlorobutane**	**SRMJEEE – 2013**
The two enantiomers of secondary butyl chloride differ from each other in property– **Specific rotation**	AP-EAMCET- (Engg.) - 2010
In the reactions $B \xrightarrow{\text{Lindland catalyst}+H_2} RC \equiv CR \xrightarrow{Na/NH_3} A$ A and B are geometrical isomers. Then– **A is trans and B is cis**	**AP - EAMCET (Medical) - 2007**
Ibuprofen contains– **Only S-enantiomer**	**AMU-2012**
α-D(+)- glucose and β-D(+)-glucose are– **anomers**	**Assam CEE-2014**
The isomers which can be interconverted through rotation around a single bond are– **Conformers**	**BCECE-2009**
The type of isomerism observed in benzaldoxime is– **tautomerism**	**BCECE-2011**
The isomers which can be converted into another form by rotation of the molecule around single bond are– **conformers**	**BCECE-2010**
Geometrical isomers differ in– **spatial arrangement of atoms**	**BCECE-2012 AIPMT -2012, 2002**
The restricted rotation about carbon-carbon double bond in 2- butane is due to:– **Sideways overlap of two p-orbitals**	**[BITSAT- 2008]**
$C_6H_5C \equiv N$ and $C_6H_5N \rightleftarrows C$ exhibit which type of isomerism– **Position**	**[BITSAT- 2011]**
Methoxy methane and ethanol are– **Functional isomers**	**CG PET -2007**
Polarimeter is used to determine _____ of compounds.– **d and *l* configuration**	**GUJCET-2019**
Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the presence of – **A vinyl group**	**[AIEEE 2011]**
Compound with molecular formula C_3H_6O can show– **Functional group isomerism**	[JEE Main 2021, 18 March Shift-I]
The number of stereoisomers possible for 1, 2- dimethylcyclopropane is– **three**	[JEE Main 2021, 26 Aug Shift-II]
Compounds having the same molecular formula but different structures are classified as– **structural isomers**	**J & K CET-(2014)**
There are four conformational isomers of n-butane. Eclipsed, fully eclipsed, Gauche, Staggered Arrange these isomers of n-butane in increasing order of energy.– **Staggered < Gauche < Eclipsed < Fully eclipsed**	**J & K CET-(2018, 2017)**
The number of stereoisomers that can exist for 3-chlorobutan-2-ol is– **4**	**J & K CET-(2019)**
2-Pentanone and 3-methyl-2-butanone are a pair of– **chain isomers**	**J & K CET-(2006)**
The separation of racemic mixture into the pure enantiomers is termed as– **resolution**	**J & K CET-(2011)**
The d and *l* enantiomers of an optically active compound differ in– **Their rotation of plane polarized light**	**J & K CET-(2010)**
The optical rotation of an optically active compound is– **Independent of the length of the polarimeter tube and concentration of the compound**	**J & K CET-(2009)**
Least stable conformer of cyclohexane is– **Boat**	**J & K CET-(2008)**
Different structures generated due to rotation about C-C axis of an organic molecule, are examples for– **Conformational isomerism**	**J & K CET-(2007)**
n-pentane and 2-methylbutane are a pair of– **Constitutional isomers**	**J & K CET-(2006)**
Cis-trans isomers generally – **Contain double bonded carbon atoms**	**JCECE - 2005**
The structures of $(CH_3)_3CBr$ and $CH_3[CH_2]_3Br$ represent– **Chain as well as position isomerism**	**JIPMER-2012**

Search on TG: @apna_pdf

@apna_pdf

The isomerism that arises due to restricted bond rotation is– **Geometrical isomerism**	**JIPMER-2011**
Dihedral angle between two methyl groups of n-butane in the gauche and anti forms are– **60º, 180º**	**JIPMER-2010**
Stereoisomers differ in– **Configuration**	**JIPMER-2008**
Maleic acid and Fumaric acids are– **Geometric Isomers**	**VITEEE- 2008**
Least energetic conformation of cyclohexane is– **chair conformation**	**Karnataka-CET-2013**
Meso compounds do not show optical activity because– **They contain plane of symmetry**	**Karnataka-CET-2013**
Mesomeric effect involves– **delocalisation of π-electrons**	**Karnataka-CET-2013**
The maximum number of possible optical isomers in 1-bromo-2-methyl cyclobutane is– **4**	**Karnataka-CET-2011**
The letter D' is D-glucose signifies– **configuration at a particular chiral carbon**	**Karnataka-CET, 2010**
The isomerism that arises due to restricted bond rotation is– **geometrical isomerism**	**Kerala-CEE-2010**
Isomers which can be interconverted through rotation about C—C single bond are– **conformers**	**Kerala-CEE-2015**
Number of constitution isomers of alkane with formula C_6H_{14} is– **5**	**Kerala-CEE-2018**
In the Hofmann rearrangement of primary amides having optically active group with S-configuration, the product amine has– **S-configuration**	**Kerala-CEE-2019**
While assigning R, S configuration, the correct order of priority of groups attached to chiral carbon atom is– **$CONH_2 > COCH_3 > CHO > CH_2OH$**	**MHT CET-2016**
In an S_N1 reaction on chiral centres, there is– **inversion more than retention leading to partial racemisation**	**(NEET-2015)**
The staggered conformation of ethane is more stable than eclipsed conformation, because – **staggered conformation has no torsional strain**	**NEET-I 2016**
Dihedral angle of least stable conformer of ethane is– **0°**	**NEET-2021**
Meso –dibromobutane on dehalogenation gives– **Trans-2-butene**	**UP CPMT-2014**
The most stable conformation of ethylene chlorohydrin at room temperature is– **Gauche**	**UP CPMT-2013**
A solution of D-glucose in water rotates the plane of polarised light– **to the right**	**UPTU/UPSEE-2015**
A compound contains two dissimilar asymmetric C–atoms. The number of optical isomers is– **4**	**UPTU/UPSEE-2014**
The number of isomeric alkanes having the molecular formula C_5H_{12} is– **three**	**UPTU/UPSEE-2009** **MHT CET-02.05.2019 Shift-II**
Racemic compound has– **equimolar mixture of enantiomers**	**UPTU/UPSEE-2009**
The well known compounds, (+)- lactic acid and (–)- lactic acid, have the same molecular formula, $C_3H_6O_3$. The correct relationship between them is– **optical isomerism**	**WB-JEE-2012**
The isomerisation of 1-butyne to 2- butyne can be achieved by treatment with– **Ethanolic potassium hydroxide**	**WB-JEE-2017**
The conformations of n-butane, commonly known as eclipsed, gauche and anti-conformations can be interconverted by–**rotation around C2–C3 linkage**	**WB-JEE-2019**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

On heating, some solid substances change from solid to vapour state without passing through liquid state. The technique used for the purification of such solid substances based on the above principle is known as- **Sublimation**	**NEET-05.05.2024**
The conjugate base of NH_4^+ is– **NH_3**	**AP-EAMCET-07.07.2022, Shift-I**
Ammonia is a Lewis base because it is– **Electron pair donor**	**TS-EAMCET-20.07.2022, Shift-II**
Number of resonating structures for Dewar's benzene will be– **Three**	**MPPET- 2009**
Acetic acid is less acidic than formic acid because of the– **Inductive effect of – CH_3 groups**	**SRMJEEE – 2009**
CCl_2 is– **An electrophile**	**AMU-2015**
Alkyl halide can be converted into alkene by– **Elimination reaction**	**BCECE-2005**
Inductive effect involves– **Displacement of σ-electrons**	**JCECE - 2009**
The number of sigma and pi (π) bonds present in benzene respectively are– **12, 3**	**JCECE - 2009**
The electrophile involved in the sulphonation of benzene is– **SO_3**	**Karnataka-CET, 2009**
The carbon-carbon bond length in benzene is– **In between C_2H_6 and C_2H_4**	**Karnataka-CET, 2009**
Amines behave as– **Lewis base**	**Karnataka-CET, 2008**
Electromeric effect is– **Temporary effect**	**UPTU/UPSEE-2009**
Reaction of aqueous NaOH with $CHCl_3$ gives– **$:CCl_2$**	**SCRA-2015**
The unstable intermediate dichlorocarbene [$:CCl_2$] is formed during– **Reimer-Tiemann reaction.**	**COMEDK 2014**
Wilkinson's catalyst is used for– **Hydrogenation**	**AMU-2013**
CH_3CH_2Cl undergoes homolytic fission, produces– **$CH_3\dot{C}H_2$ and $\dot{C}l$**	**BCECE-2008**
The resonance energy of benzene in kcal/mol is about– **≈ 40**	**BCECE-2009**
The attacking reagent in the nitration of benzene is– **Nitronium ion**	**J & K CET-(2019)**
The reaction intermediate produced by homolytic cleavage of bond is called– **Free radical**	**J & K CET-(2007)**
Hybridisation states of C in CH_3^+ and CH_3^- are– **sp^2,sp^3**	**JIPMER-2011**
Reimer-Tiemann reaction involves – **Carbene intermediate**	**Manipal-2018**
Geometry of methyl free radical is– **Planar**	**UPTU/UPSEE-2009**
For a compound with empirical formula C7H8O, number of aromatic structures possible are– 5	**AP EAMCET (Engg.) 21.09.2020, Shift-II**
Cyclopentadienyl anion is– Non-benzenoid and aromatic	**TS EAMCET-2017**
CHCl3 + C6H5NH2 + 3NaOH → A + 3B + 3C. In the above reaction, the product 'A' is– phenyl isocyanide	**BCECE-2007**
According to Huckel's rule an aromatic compound must possess– $(4n + 2)\pi$ electrons	**J & K CET-(2007)**
An aromatic compound among other things should have a π-electron cloud containing (4n+2) π electrons where n can't be– 1/2	**J & K CET-(2005)**
Benzene does not undergo addition reactions easily because– resonance stabilized system is to be preserved	**JCECE - 2013**
Cycloheptatrienyl cation is– Non-benzenoid and aromatic	**Kerala-CEE-2017**
The compounds pyridine and planar cyclo-octatetraene are– aromatic and anti-aromatic	**Kerala-CEE-2019**
Conversion of hexane into benzene involves the reaction of– Dehydrogenation	**MHT CET-2018**

Search on TG: @apna_pdf

@apna_pdf

21. Hydrocarbons

Alkanes

- The alkane that gives only one mono-chloro product on chlorination with Cl_2 in presence of diffused sunlight is– **neo-pentane**
- Dihedral angle of least stable conformer of ethane is– **0^0**
- Monobromination of 2-methylbutane gives ..... distinct isomers– **Four**
- Chlorination of alkanes is a photochemical process. It is initiated by the process of– **Homolysis**
- Ethane is formed during the formation of chloromethane by chlorination of methane because– **Two methyl free radicals may combine during chlorination to give ethane**
- An inhibitor is described as a substance that- **Slows down or stops a reaction**
- Only one monochloro derivative is given by – **neo-Pentane**
- Hydrocarbon which is liquid at room temperature is– **Pentane**
- Kerosene is a mixture of– **Aliphatic hydrocarbons**
- The compounds will react with Na to form 4, 5-diethyloctane?–

$$CH_3CH_2CH_2 - \underset{\displaystyle Br}{\underset{|}{CH}} - CH_2 - CH_3$$

- Hydrocarbon which is liquid at room temperature is– **Pentane**
- The major constituent of natural gas is– **Methane**
- The products is formed when n-heptane is passed over ($Al_2O_3 + Cr_2O_3$) catalyst at 773 K?– **Toluene**
- The compound cannot be formed from Wurtz reaction?– **Methane**
- Sodium salt of X is heated with soda lime and gives ethane X is– **Propanoic acid**
- Marsh gas is. **CH_4**
- The alkane that is expected to have lowest boiling point?– **2, 2-dimethyl propane**
- The compound with highest boiling point is– **n-hexane**
- An alkyl halide by formation of its Grignard reagent and heating with water gives propane. The original alkyl halide?– **Propyl bromide**
- For preparing an alkane a saturated solution of sodium of potassium salt of a carboxylic acid is subjected to– **Electrolysis**
- The five isomeric hexanes, the isomer which can give two monochlorinated compounds is– **2, 3-dimethyl butane**
- The reactions is not correct for preparation of alkanes?– $(CH_3)_3CCl \xrightarrow{LiAlH_4} (CH_3)_2CH_2$
- The alkane which differs from the other member of the group– **2, 2-Dimethylbutane**
- The isomeric heptanes can yield seven different monochlorinated products upon free radical chlorination is– **3-methyl hexane**
- What happens when methane reacts with conc. HNO_3 at high temperature– **Nitro methane is formed**
- The dihedral angle between the hydrogen atoms of 2 methyl groups in staggered conformation of ethane is– **60°**
- The most stable conformation of ethane is– **Staggered**
- The alkanes cannot be produced by Kolbe electrolysis of sodium or potassium salts of carboxylic acids– **Methane**
- The I.U.P.A.C. name of neopentane is– **2, 2-Dimethyl propane**
- Methyl bromide is converted into ethane by heating it in ether medium with– **Na**
- Pyrolysis of methane and ethane respectively are– **Exothermic & Endothermic, Endothermic & Exothermic**
- Wrong statement regarding alkanes– **Most of the alkanes are soluble in water**
- The reaction represents $C_{12}H_{26} \rightarrow C_6H_{12} + C_6H_{14}$ **Cracking**
- Final products of complete oxidation of hydrocarbon is– **$H_2O + CO_2$**
- Isomerisation in alkane can be brought by using– **Anh.$AlCl_3$/HCl**

TEAM SKY

Search on TG: @apna_pdf

@apna_pdf

- The number of sigma bonds formed in ethane by the overlapping of sp^3-sp^3 orbitals– **1**
- Ethylene is converted to ethane in the presence of Ni at 300°C In this reaction the hybridisation of carbon changes from– **sp^2 to sp^3**
- The conformer of butane molecule has lowest energy?– **Anti staggered**
- The difference in monomer unit of polyisoprene & Neoprene polymer respectively?– **CH_3 group in Isoprene & –C*l* group in chloroprene at 2nd carbon**
- The molecule which is free from angular strain is– **Cyclohexane**
- In the reaction, the major product is–

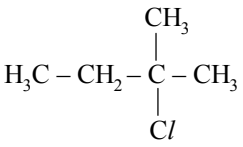
–

Alkenes

- When ethanol is heated with conc. H_2SO_4, a gas is produced. The compound formed. When this gas is treated with cold dilute aqueous solution of Baeyer's reagent is– **Glycol**
- Compound X on reaction with O_3 followed by Zn/H_2O gives formaldehyde and 2-methylpropanal as products. The compound X is– **3-methylbut - 1 -ene**
- 1,3,5,7-Octatetraene contains X σ-bonds and Y π-bonds. 'X' and 'Y' are respectively are – **17, 4**
- Geometrical isomerism is caused by – **Restricted rotation around C = C bond**
- Total number of geometrical isomers possible for the given compound

$CH_3 - CH = Ch - CH = CH - C_2H_5$ are- **Four**

- 2-Bromopentane is treated with alcoholic KOH solution. The major product formed in this reaction and the type of elimination are– **Pent-2-ene, β-elimination**
- An alkene "A" on reaction with O_3 and $Zn - H_2O$ gives propanone and ethanal in equimolar ratio. Addition of HC*l* to alkene "A" gives "B" as the major product. The structure of product "B" is–



- The products of dehydrohalogenation of 2-Iodopentane are– **2-Pentene (major), 1-Pentene (minor)**
- The compound formed when alcoholic solution of ethylene dibromide is heated with granulated zinc is– **Ethene**
- Pent-l-ene with HCl gives– **2-chloropentane**
- Presence of unsaturation in organic compounds can be tested with– **Baeyer's reagent**
- The reaction of $CH_3CH = CH_2$ with HOCl will yield– **1-chloro-2-propanol**
- Addition of HBr to propene–**Follows Markovnikov's rule**
- Addition of HBr to 2-methyl-1-propene in the presence of hydrogen-peroxide produces– **1-Bromo-2-methylpropane**
- In Kharasch effect; reaction follows– **Free radical addition**
- Baeyer's reagent is– **1% Alkaline $KMnO_4$**
- Ethylene + S_2Cl_2 → "A"; The compound "A" is– **Mustard gas**
- The ..... shows geometrical isomerism–**But-2-ene**
- ..... is maximum stable– **Trans-but-2-ene**
- 2-butene shows geometrical isomerism due to– **Restricted rotation about double bond**
- In preparation alkene from alcohol using Al_2O_3, ... is the effective factor– **Temperature**
- The compounds with molecular formula C_5H_{10} yield acetone on ozonolysis– **2-methylbut-2-ene**
- 2-Bromopentane is heated with potassium ethoxide in ethanol. The major product obtained is– **Trasn-pent-2-ene**
- When 3, 3-dimethyl 2-butanol is heated with H_2SO_4, the major product obtained is– **2, 3-dimethly 2-butene**
- An alkene X is obtained by dehydration of an alcohol Y. X on ozonolysis gives two molecules of ethanal for every molecule of alkene. X and Y are– **X = 2-butene, Y = 2-butanol**
- Hydrolysis of ozonide of but-l-ene gives– **Propionaldehyde and formaldehyde**
- Ozonolysis of 2,3-dimethylbut-1-ene followed by reduction with zinc and water gives– **Methanal and 3-methylbutan-2-one**
- Total number structures are possible for C_5H_8 with one triple bond– **3**
- Calcium carbide is treated with water, to form– **Ethyne**
- The reactions does not show the correct products of the reactions?–

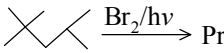
$$CH_3 - CH = CH_2 \xrightarrow[\text{Peroxide}]{HCl} CH_3 - CH_2 - Cl$$

- The compounds will show cis-trans isomerism?– **$CH_3HC = CCl\,CH_3$**
- The ease of dehydrohalogenation for different Halogens is in the order– **Iodide >Bromide > Chloride**

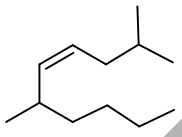
JEE-SPY

Search on TG: @apna_pdf
@apna_pdf

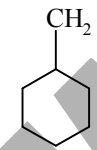
- Ozonolysis of 2,3- dimethyl but -1- ene followed by reduction with zinc and water gives–
  Methanal and 3-methylbutane-2-one
- For the given reaction, how many products (mono substituted) will be obtained including all isomers?–



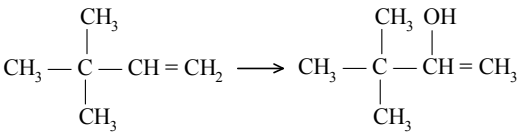
  6
- The predominant product in the reaction of HOBr with propene?– **1-bromo-2-propanol**
- For synthesis of 1-butene, CH_3MgI should be treated with– **Allylchloride**
- An alkene on vigorous oxidation with hot $KMnO_4$ gives only acetic acids, the alkene is–
  $CH_3CH = CHCH_3$
- The correct structure of 2, 6-Dimethyl-dec-4-ene.



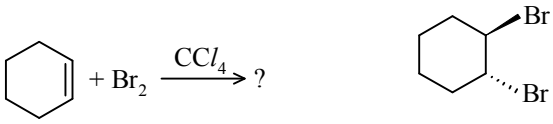
- An alkene on ozonolysis gives methanal as one of the product. Its structure is–



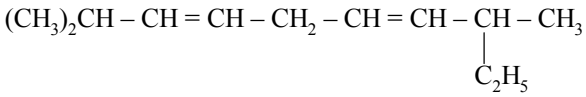
- When an alkene on ozonloysis gives formaldehyde and acetaldehyde, the alkene is– **Propene**
- Ethylene can be separated from acetylene by passing the mixute through– **Ammonical Cu_2Cl_2**
- Aqueous solution of sodium succinate on electrolysis gives– **$CH_2 = CH_2$**
- 1, 3, 5, 7-Octatetraene contains X σ bonds and Y π bounds. "X" and "Y" are– **17, 4**
- The alkene that exhibits geometrical isomerism is–
  2-butene
- The compound formed when alcoholic solution of ethylene dibromide is heated with granulated zine is– **Ethene**
- Addition of cold conc. H_2SO_4 with alkene is an example of– **Electrophilc addition reaction**
-



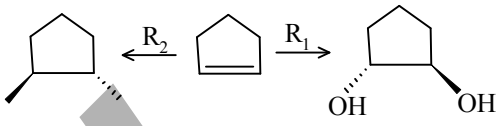
  Above conversion is possible in presence of following reagents–**$Hg(OCOCH_3)_2$/THF & $NaBH_4$ + H_2O**
-



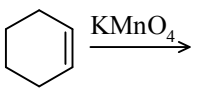
- IUPAC name of the alkene is,



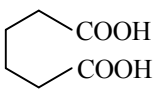
  –4-Methylocta-1, 3, 5, 7-tetraene
-



  R_1 & R_2 are respectively–
  Cold alkaline $KMnO_4$,HCO_3H, $H_3O^{\oplus}$
- Ethylene readilyundergoes the type of reaction– **Addition**
- On reductive ozonolysis of ethylene gives– **Aldehyde**
- When ethanol vapours are passed over alumina heated at 350°C, the main product obtained is–**C_2H_4**
- Kharasch effect operate?–**$CH_3 – CH = CH – CH_3$ + HBr**
- The olefine which on ozonolysis gives– **Pent-2-ene**
- The oxidation product of ethylene by air at 200-400°C in presence of silver catalyst is–
  Enthylene oxide
- What are X and Y in the reaction,
  $C_2H_4 + H_2sO_4 \xrightarrow{80°C} X \xrightarrow[\Delta]{H_2O} –$
  C_2H_5, OSO_3H, C_2H_2OH
- The sequence of reactions the compound A is,
  $A \xrightarrow{HBr} B \xrightarrow{alc\,KOH} C \xrightarrow{O_3+Zn/H_2O} CH_3CHO$ + HCHO– **Propene**
- IUPAC names of the products obtained by addition of HBr to hex-1-ene in the absence of peroxide and in the presence of peroxide respectively are–
  2-Bromolhexane, 1-Bromohexane
- Z –isomer $\xleftarrow{y}$ 2 –butyne $\xrightarrow{x}$ E–isomer x, y respectively are– **$Na/NH_{3(liq)}$ and $Pd/BaSO_4$ +H_2**
- The final product in the given reaction



  is –



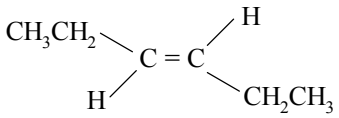
TEAM SPY

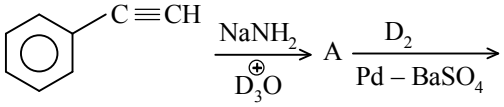
Search on TG: @apna_pdf

@apna_pdf

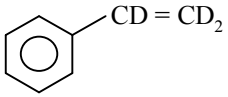
Alkynes

- One mole of 1,2-dibromopropane on treatment with X moles of $NaNH_2$ followed by treatment with ethylbromide gave 2-pentyne. The value of X is– **Three**
- The reagent which can easily distinguish between 1-butyne and 2-butyne is– **Ammoniacal Cu_2Cl_2**
- The product for the reaction is
  $CH \equiv CH + HOCl \rightarrow$ **Cl_2CHCHO**
- When l-butyne undergoes oxymercuration with the help of $HgSO_4$ + H_2SO_4, the product(s) formed is/are– **$CH_3CH_2COCH_3$**
- Ozonolysis products of 2-pentyne after decomposition of ozonide with water and subsequent oxidation are– **Ethanoic acid and propanoic acid**
- Acetylene when oxidized chromic acid gives– **Acetic acid**
- The catalyst used to reduce an alkyne to alkene is– **Free radical addition**
- The ..... molecules represents the order of hybridisation sp^2, sp^2, sp, sp from left to right atoms– **$CH_2 = CH - C \equiv CH$**
- ..... can be used as the halide component for Friedel Crafts reaction– **Isopropyl chloride**
- The organic compounds has same hybridization as its combustion product-(CO_2)– **Ethyne**
- The bond length between central carbon atom and other carbon atom is minimum in– **Propyne**
- The cylindrical shape of alkyne is due to– **One sigma C–C and two π C–C bonds**
- When acetylene is passed through dil, H_2SO_4 in the presence of $HgSO_4$, the compound formed is– **Acetaldehyde**
- Accetylene gives white precipitate with ammonical silver nitrate but ethylene cannot give because– **Acetylene posses acidic hydrogen**
- The monosodium salt of acetylene on treating with methyl chloride forms– **$CH \equiv C - CH_3$**
- 1-pentyne and 2-pentyne can be distinguished by– **Silver mirror test**
- $CH_3 - C \equiv CH \xrightarrow[H_2SO_4]{HgSO_4} Y \xrightarrow{NaBH_4} Z$ is– **Propan-2-ol**
- Iodoform on heating with silver powder gives– **C_2H_2**
- Cold and dil.Alk. $KMnO_4$ will oxidise acetylene to– **Oxalic acid**
- Acetylene when treated with dilute HCl at 60°C (333K) in presence of $HgCl_2$ produces– **Vinyl chloride**
- $CH_3CH_2C \equiv CH \xrightarrow{NaNH_2/NH_2(l)} \xrightarrow{CH_2CH_2Br} \xrightarrow[Li,NH_3(l)]{}$



- What happens when calcium carbide is treated with water?– **Ethyle is formed**
- Ozonolysis products of 2-pentyne after decomposition of ozonide with water and subsequent oxidation are–**Ethanoic acid and propanoic acid**
- 2, 2-dibromopropane on reaction with HBr gives **$CH_3 \equiv CH$**
- What happens when calcium carbide is treated with water?– **Ethyne is formed**
- Ozonolysis products of 2-pentyne after decomposition of ozonide with water and subsequent oxidation are–**Ethanoic acid and propanoic acid**
- 2, 2-dibromopropane on reaction with HBr gives **$CH_3C \equiv CH$**
- In the reaction,
  $B \xleftarrow{\text{lindlar catalyst} + H_2} RC \equiv CR \xrightarrow{Na/NH_3} A$.A and B are geometrical isomers– **A is trans and B is cis**
- The reagent used to convert an alkyne to alkene is– **Lindlar's catalyst**
- The product formed when acetylene reacts with hypochlorous acid?– **Cl_2CHCHO**
- Ethylidene dichloride is obtained by the reaction of excess of HCl with– **Acetylene**
- 

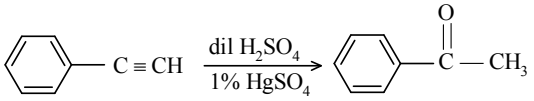
  End product B is–



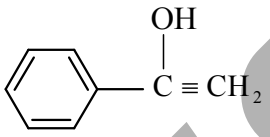
- 1-butyne on hydration gives– **Butan -2-one**
- The organic compounds has same hybridisation as its combustion product - (CO_2)?– **Ethyne**
- Propyne on hydrolysis gives **Mg_2C_3**
- The compounds reacts with an aqueous solution of $[Ag(NH_3)_2]^+OH$?– **1-butyne**
- How many structures are possible for C_5H_8 with one triple bond?– **3**
- Excess of CH_2COOH is reacted with CH = CH in presence of Hg^{2+}, the product is– **$CH_3CH(OOCCH_3)_2$**
- $C_4H_6 \xrightarrow{NaNH_2} X \xrightarrow{CH_2CH_2Br} Y \xrightarrow{Pd/C,BasO_4} Z \xrightarrow[Zn/H_2O]{O_3} W$– **W is propanal**

Search on TG: @apna_pdf

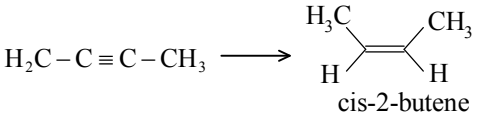
@apna_pdf

- Alkynes exhibit– Chain isomerism, Position isomerism, Functional isomerism
- The IUPAC name of the compound having the formula $CH \equiv C - CH = CH_2$– **But-1-ene-3-yne**
- Acetylene can be obtained by the electrolysis of the compound– **Potassium fumerate**
- The gas obtained when ethylene chloride reacts with alcoholic potash and sodamide is– **C_2H_2**
- Iodoform on heating with silver powder gives–**C_2H_2**
- The reagent used for converting Acetylene tetrabromide into ethyne is– **Zinc dust**
- Pure acetylene has sweet smell, whereas impure gives garlic odor due to presence of– **PH_3**
- 
I

ntermediate of this conversion is–



- The regent used for obtaining trans alkene from alkyl substituted acetylene with hydrogen is– **Na in liq.NH_3**
- Gem dihalides on treatment with alcoholic KOH give– **Alkyne**
- 2-Butyne when treated with lithium in presence of liquid ammonia gives– **Trans-2-butene**
- The minimum boiling point?– **Isobutane**
- An alkyne (C_7H_{12}) on ozonolysis gives isobutyric and & propionic acid, find structure of hydrocarbon– **2 methyl 3-hexyne**
- The number of sigma (σ) and pi (π) bonds in pent-2-en-4- yne is– **–10 σ bonds and 3π bonds**
- The most suitable reagent for the following conversion, is–



cis-2-butene

H_2, Pd/C, quinoline

- The product when acetylene reacts with HCN– **$CH_2 = CH - CN$**
- 'x' on ozonolysis gives a dial while 'y' reacts with Baeyer's reagent to give a diol. Then 'x' and 'y' respectively are– **C_2H_2 & C_2H_4**

Aromatic Hydrocarbons

- Coal tar is the main source of–**Aromatic compounds**
- Although benzene is highly unsaturated it does not undergo addition reactions. The explanation of this can be suggested as– **π-electrons of benzene ring are delocalised**
- The carbon-carbon bond length in benzene is– **1.39Å**
- Benzene easily show electrophilic substitution reactions due to- **stable ring and high π electron density**
- Nitration of benzene is carried out with conc. HNO_3 in presence of conc. H_2SO_4. The role of conc. H_2SO_4 is to provide–**Electrophile during the reaction**
- In halogenation of aromatic hydrocarbon, a halogen carrier is used which is generally a Lewis acid. The main function of this reagent is to generate the species– **X^+**
- The reaction is known as

$$C_6H_6 + CH_3Cl \xrightarrow[(anhy.)]{AlCl_3} C_6H_5CH_3 + HCl$$

–Friedel-Crafts reaction

- 1, 2-Benzpyrene is– **A polynuclear hydrocarbon, Carcinogenic in nature**
- The increasing order of reduction of alkyl halides with zinc and dilute HCl is– **R–Cl < R-Br < R-1**
- Product formed when n-heptane is passed over ($Al_2O_3 + Cr_2O_3$) catalyst at 773K– **Toluene**
- Toluene $\xrightarrow[H_2SO_4]{K_2Cr_2O_7}$ Y Here Y is– **Benzoic acid**
- $C_6H_6 + Z \xrightarrow{AlCl_3}$ Toluene, Z is– **Chloromethane**
- $C_6H_6 + \xrightarrow[V_2O_5/\Delta]{Oxidation}$ X, Here X is– **Maleic anhydride**
- The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives 'X' and reaction in presence of light gives 'Y'. Thus, 'X' and 'Y' are– **X = o-and p-chlorotoluene, Y = Trichloromethyl bezene**
- Benzene reacts with CH_3Cl in the presence of anhydrous $AlCl_3$ to form– **Toluene**
- Nitrobenzene can be prepared from benzene by using a mixture of conc. HNO_3 and conc. H_2SO_4 in the mixture, nitric acid acts as a/an– **Base**
- Gammexane is– **Benzene hexachloride**
- In Friedel-Craft's alkylation, besides $AlCl_3$ the other reactants are– **$C_6H_6 + CH_3Cl$**
- In Friedel-Crafts reaction, toluene can be prepared by– **$C_6H_5 + CH_3Cl$**
- Types of hydrocarbon is – **Saturated hydrocarbon, Aromatic hydrocarbon, Unsaturated hydrocarbon**

TEAM SPY

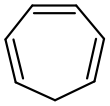
Search on TG: @apna_pdf
@apna_pdf

- The major constituent of natural gas is– **Methane**
- The number of chain isomers possible for hydrocarbon C_3H_{12} is– **3**
- Wurtz reaction is used to unite– **Two alkyl halides**
- In a reaction, $Cl_2 + CH_4 \xrightarrow{h\upsilon} Ch_3Cl + HCl$ presence of a small amount of oxygen–

  Decreases the rate of reaction for a brief period of time
- A mixture of l-iodoethane and l-iodopropane is treated with sodium metal and dry ether to carry out Wurtz reaction. The hydrocarbons will be formed–

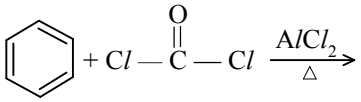
  Butane + Pentane + Hexane
- The alkane that is produced when sodium salt of butanoic acid is heated with soda lime–

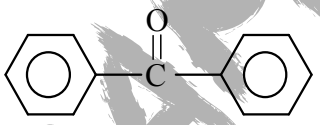
  $CH_3CH_2CH_3$
- The compound is not an aromatic compound?–



- The suitable to synthesize chlorobenzene?–

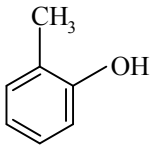
  Benzene, Cl_2, anhydrous $FeCl_2$
- Correct product is.





- The treatment of benzene with iso-butene in the presence of sulphuric acid gives–

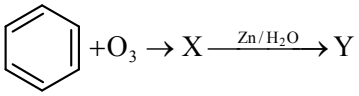
  Tert-butyle benzene
- The most reactive towards electrophilic reagent?–



- A compound that undergoes bromination easily–

  Phenol
- Not be soluble in sodium hydrogen carbonate is. **o-nitrophenol**
- Nitration and chlorination of benzne are–

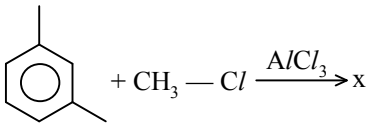
  Electrophilic substitution in both the reaction
- Similar to alkenes and alkynes benzene also undergoes ozonolysis. In the sequence of the given reaction identify X and Y–



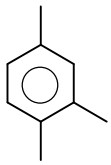
  X = Triozonide, Y = Glyoxal
- The reaction is known as

  $C_6H_6 + CH_3Cl \xrightarrow[(Anhyd.)]{AlCl_3} C_6H_5CH_3 + HCl$–

  Friedal - Craft's reaction
- Benzene easly shows– **Electrophilic substitution reaction due to stable ring and high π e density**
-



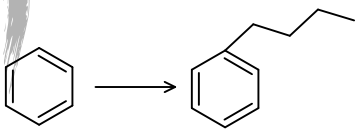
–



- Formation of compound confirms the unsaturation character of benzene?–

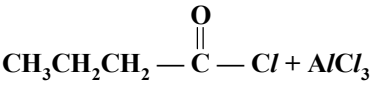
  Cyclohexane, Gamexane, Triozonide
- The compounds reacts slower in electrophilic substitution?– **$C_6H_5NO_2$**
- Aromatic compounds give smoky flame because–

  Carbon percentage is more
- Bond length fo C–C in benzene– **1.39 A°**
-

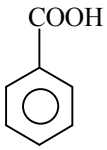


The conversion is possible by method

F. C Acylation



followed by clemmenson reduction
- Chlorination of toluene in presence of light & heat followed by treatment with aq KOH & subsequently with dil HCl gives–



- Chemical name of the insecticide gammaxene is–

  Benzene hexachloride
- Preparation of benzene from phenol is– **Reduction**
- Benzene is resonance hybrid of mainly two Kekule structures. Hence,– **Two structure make equal contribution to resonance hybrid**
- Cyclobutadiene is said to be– **antiaromatic**
- Rate determining step in nitration of benzene is–

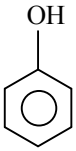
  Formation of carbocation
- A dicarbonyl compound with O_3 followed by reduction with zine and water?– **C_6H_6, C_2H_2**

Search on TG: @apna_pdf

@apna_pdf

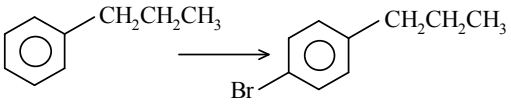
■ The reagents benzene does not undergo substitution reaction?–

Chlorine in presence of sunlight

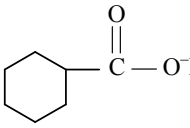
■  +Zn → X Here the product X is used as a–

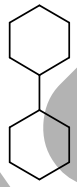
For dry cleaning

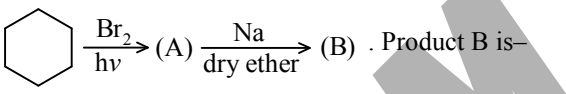
■ The conversion

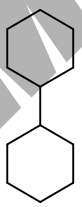


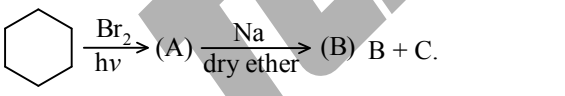
can be carried out using– **Br_2/Fe**

■  major product A:



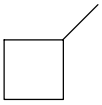
■  . Product B is–



■  B + C.

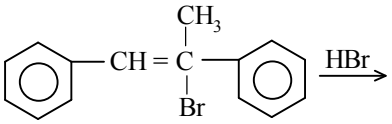
Products B & C are– **Geometric isomers**

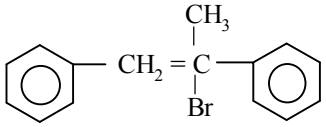
■ How may distinct monochlorinated products, including stero-isomers, can result when the alkane below is heated in the presence of Cl_2?–



8

■ The major product, of the reaction?–



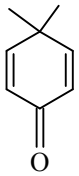


■ The final major product of the reaction is–

$CH_3 - CH_2 - C \equiv C - H \xrightarrow[(2)\,CH_3CH_2Br]{(1)\,NaNH_2} -$

CH_3–CH – C ≡ C – CH_2 – CH_3

■ The molecule is not aromatic?–

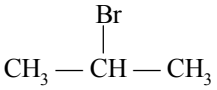


■ But-2- is treated with HC*l*. The product formed is–

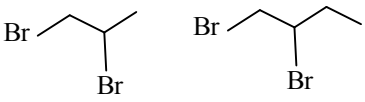
(±) sec butyl chloride

■ Maleic acid reacts with Br_2/CCl_4. The product formed is– **(±) –2, 3-dibromosuccinic acid**

■ The compounds is most reactive for Wurtz reaction?–

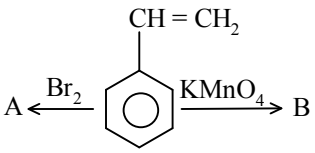


■ The compound is a possible product from addition of Br_2 to 1-butene?–



■ The correct statement is **Acetylene is more reactive than ethylene to an electrophilic attack**

■ A compound 'X' on ozonolysis followed by reduction gives an aldehyde, C_2H_4O and 2-Butanone. Compound 'X' is– **3-ethyl pent-3-ene**

■ 

Compound A and B respectively are–

styrenedibromide, benzoic acid

■ cis-2-Butene on treatment with bromine gives–

Cis & trans alkene

■ The gases liberated at anode in the electrolysis of sodium acetate are– **C_2H_6 & CO_2**

■ The substance reacts with water to give ethane–

C_2H_5MgBr

■ The ratio of products, 1-chloropropane to 2-chloropropane respectively formed in the chlorination of propane if all the hydrogens are abstracted at equal rates is– **75:25**

■ Amount of oxygen consumed for complete combustion of 29 g butane?– **104 g**

■ In the reaction, A and B respectively are,

$A \xrightarrow{HBr} C_2H_5Br \xrightarrow{B} A-$

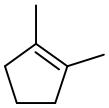
C_2H_4 and alcoholics KOH/Δ

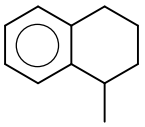
TEAM SPY

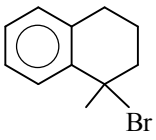
Search on TG: @apna_pdf

@apna_pdf

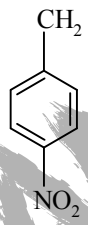
- Planar molecule is– **$CH_2 = CH_2$**
- The compound that would produce Heptane-2, 6-dione on ozonolysis is–



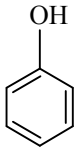
-  $\xrightarrow[1\text{ eq.}]{NBS}$ X (major product); X is-



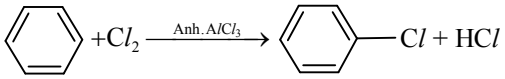
- In nitrating mixture HNO_3 acts as a– **Base**
- Cannot form ozonide– **Ethane**
- The order of activites of the various Ortho and Para director is– **$-O^- > -OH > -OCH_3 > -OCOCH_3$**
- In the nitration mixture concentrated sulphuric acid is used– **As dehydrating agent**
- The carboxylic acid undergo fastest decarboxylation reaction with sodalime?–



- 2-Methylbutane on reacting with bromine in the presence of sunlight gives mainly– **2-bromo-2-methylbutane**
- Phenyl magnesium bromide reacts with methanol to give– **a mixture of benzene and Mg (OMe)Br**
- The reactions of methane is incomplete combustion?– **$CH_4 + 2O_2 \rightarrow CO_2(g) + 2H_2O(l)$**
- The alkane cannot be made in good yield by Wurtz reaction?– **[2020]** ***n*-Heptane**
- The isomeric hexanes, the isomers that give the minimum and maximum number of monochloro derivatives are respectively– **2-methylpentane and 2, 2-dimethylbutne**
- An organic compound with molecular formula C_6H_{12} upon ozonolysis gave only acetone as the product. The compound is– **2, 3 dimethyl-2-butene**
- Compound X on reaction with O_3 followed by Zn/H_2O gives formaldehyde and 2-methyl propanal as products. The compound X is– **3-Methylbut-1-ene**
- The compound is most reactive in electrophilic aromatic substitution–



- A free radical substitution reaction– **Methane with $Br_2/h\nu$**
- The reaction that proceeds through an eletrophilic substitution, is–



- Hydrocarbon (1) reacts with bromine by substitution to form an alkyl bromide which by Wurtz reaction is converted to gaseous hydrocarbon containing less than four carbon atoms (1) is– **CH_4**
- The compound C_7H_8 undergoes the following reactions

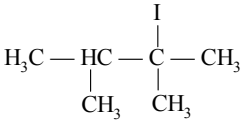
$C_7H_8 \xrightarrow{3Cl_2/\Delta} A \xrightarrow{3r_2/Fe} B \xrightarrow{Zn/HCl} C$

The product 'C' is– **m-bromotoluene**

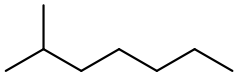
- Dihedral angle (D.A.) of least stable conformer of ethane is– **0°**
- $CH_3CH_2COO^-Na^+ \xrightarrow[Heat]{NaOH+?} CH_3 - CH_3 + Na_2CO_3$

The above reaction and Identify the missing reagent/chemical– **CaO**

- The halogens F_2, Cl_2, Br_2, I_2, in order of theri increasing reactivity with alkanes– **$I_2 < Br_2 < Cl_2 < F_2$**
- The increasing order or reduction of alkyl. halides with zinc and dilute HCl is– **R – Cl < R – Br < R –I**
- The total possible isomers formed when n-octane undergo catalytic reforming by treatment of Al_2O_3 – Cr_2O_3 at 500°C – 600°C– **4**
- An organic compound 2, 2 dibromo propane on treatment with Zn dust give X on treatment with HI give y; y is–



- The hydrocarbn taht cannot be prepared effectively by Wurtz reactions–



- The difference in potential energy between eclipsed and staggered form of ethane is– **12.55 kJ/mol**

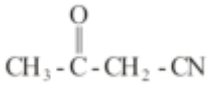
Search on TG: @apna_pdf

@apna_pdf

- Eclipsed form of ethane has higher energy due to– **Torsional strain and Steric strain**
- The angle strain in cyclopentane is– **44'**
- ..... is most stable– **Cyclohexane**
- The Chair form is more stable than boat form by potential energy ..... kJ/mol– **44**
- In iodination; for preparation of iodomethane compound used is– **HIO_3 & HgO**
- Geometrical isomers differ in– **Spatial arrangement of atoms**
- Liquid hydrocarbons can be converted to mixture of gaseous hydrocarbons by– **Distillation under reduced pressure**
- In the commercial gasoline, the type of hydrocarbons which are more desirable is– **Branched hydrocarbon**
- The most stable conformation of n-butane is– **Staggered**
- Dihedral angle in staggered form of ethane is– **60º**
- Reaction of HBr with propene in the presence of peroxide gives– **n-propyl bromide**

EXAM POINT

Alkanes

Photo-chemical smog is:– **It result from reaction of unsaturated hydrocarbon**	**JEE Main-28.06.2022, Shift-II**
The number of sigma bonds in ethane formed by the overlap of sp^3 and s orbitals is– **6**	**AP-EAMCET (Med.)-1999**
The number and type of bonds between two carbon atoms in calcium carbide are– **one sigma, two pi**	**AIEEE 2005**
Allyl cyanide molecule contains– **9 sigma bonds, 3 pi bonds and one lone pair**	**Kerala-CEE-2013**
The hybridization of oxygen atom in an alcohol molecule is– **sp^3**	**VITEEE- 2006**
The hybridisation of carbon and oxygen in electronic structure of Ether is– **sp^3 and sp^3**	**GUJCET-2008**
The carbon atoms in ethane are– **sp^3 hybridised**	**COMEDK 2011**
The type of hybridisation found in methane is– **sp^3**	**J & K CET-(2014)**
The hybridisation of each carbon in the following compound respectively is  **sp^3, sp^2, sp^3, sp**	**TS-EAMCET-2016**
The hybridization state of carbon atoms in the product formed by the reaction of ethyl chloride with aqueous KOH, is– **sp^3**	**A.P. EAMCET-1997**
In dehydrolysing reaction, $CH_3CONH_2 \xrightarrow{P_2O_5} CH_3CN + H_2O$ the hybridisation state of carbon is changed from– **sp^2 to sp**	**CG PET -2008**
A mixture of carbon monoxide, hydrogen and hydrocarbon is known as:– **Carburetted water gas**	**AP-EAMCET (Med.)-1999**
Chloroform is an anesthetic and a small amount of alcohol is added to it's bottles because– **It retards anesthetic property of chloroform**	**SCRA 2012**
The method of converting high boiling hydrocarbons into low boiling hydrocarbons is known as :– **isomerisation**	**A.P.EAMCET-1994**
The number of isomeric structures possible for a molecule having molecular formula C_5H_{12}, is– **3**	**A.P.EAMCET-1996**
The alkane that yields two isomeric monobromo derivatives is– **Propane**	**A.P.EAMCET-1997**
In Wurtz reaction, the reagent used is– **Na/dry ether**	**A.P.EAMCET-1998**
Hybridisation of oxygen in diethyl ether is– **sp^3**	**A.P.EAMCET/2007**
A solid organic compound X, on heating, directly converted into the vapour phase which on cooling solidifies. The best method for purifying X is– **Sublimation**	**A.P.EAMCET-2000, 1999, 1998**
n – octane and n-nonane have– **Similar chemical properties**	**A.P.EAMCET-1999**

TEAM SPY

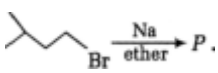
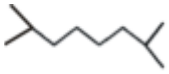
Search on TG: @apna_pdf

@apna_pdf

Alkanes cannot be prepared by Wurtz reaction– **CH_4**	**Manipal-2016 A.P.EAMCET-1999**
C_2H_5MgBr reacts with water to give– **Ethane**	**A.P.EAMCET-2000**
2, 3 dimethylhexane contains ..... tertiary .....secondary and .....primary carbon atoms, respectively.– **2, 2, 4**	**A.P.EAMCET-2003**
Ethyl chloride heated with Alcoholic KOH forms- **Ethylene**	**A.P.EAMCET-2006**
A molecule (X) has (i) four sigma bonds formed by the overlap of sp^2 and s orbitals (ii) one sigma bond formed by sp^2 and sp^2 orbitals and (iii) one π bond formed by p_x and p_z orbitals. Which of the following is X?– **C_2H_4**	**A.P.EAMCET-2006**
The most reactive compound towards nitration is:– **Toluene**	**MPPET - 2012**
Alkyl halide reacting with metallic sodium in dry ether solution is called– **Wurtz reaction**	**A.P. EAMCET-1996 AP EAMCET (Medical) - 1998**
Which gases is liberated when ethyl alcohol is heated with methyl magnesium iodide?– **Methane**	**A.P.EAMCET/2003**
In the reaction $Cl_2 + CH_4 \xrightarrow{h\nu} CH_3Cl + HCl$ presence of a small amount of oxygen– **Completely stops the reaction**	MPPET- 2009
The petrol of octane number 80 has:– **20% n-heptane + 80% iso-octane**	**MPPET-2013 UPTU/UPSEE-2010**
Separation of different fractions in fractional distillation technique takes place by– **Boiling point**	**AP EAMCET (Engg.) 17.09.2020, Shift-II**
Carbon and hydrogen in an organic compound are detected as.....– **$CaCO_3$, $CuSO_4.5H_2O$**	**AP EAMCET (Medical) - 2013**
In an agricultural field is the highest producer of methane is– **Paddy crop**	**AP EAMCET (Engg.) 21.09.2020, Shift-I**
Thermal decomposition of alkane in the absence of air is called as– **Cracking**	**MPPET-2008**
The chlorination of ethane is an example of– **Free radical substitution**	**AP EAMCET (Engg.) 2012**
Isopropyl chloride and isobutyl chloride reacts with sodium in ether to give– **2, 4-dimethylpentane**	**COMEDK 2011**
The organic compound obtained during the addition of HBr to propene in the presence of peroxide catalyst is– **1-bromopropane**	**COMEDK 2012**
When 2-bromopentane is heated with alcoholic solution of potassium hydroxide, the major product obtained is– **Pent-2-ene**	**COMEDK 2014**
The most energetic conformation of cyclohexane is– **Half chair**	**COMEDK 2016**
Methane can be converted to ethane by the reaction,– **Chlorination followed by Wurtz reaction**	**COMEDK 2018**
The most strained cycloalkane is– **Cyclopropane**	**COMEDK 2020**
Reagents is used for detection of unsaturation in alkenes– **$Cl_2/h\nu$**	**AP-EAMCET (Medical), 2003**
1, 1-dichloro propane and 2, 2-dichloro propane are reacted separately with aqueous potassium hydroxide solution, compounds 'A' and 'B' are formed. Both 'A' and 'B' gave the same product 'C' on reduction using amalgamated zinc and HCl Identify 'C'.– **Propane**	**AP-EAMCET (Medical), 2008**
$C_2H_5OH + SOCl_2 \xrightarrow{\text{Pyridine}} X + Y + Z$, in this reaction X, Y and Z respectively, are– **C_2H_5Cl, SO_2, HCl**	**AP-EAMCET (Medical), 2008**
In the reaction $C_6H_6 + R - Cl \xrightarrow{\Delta} C_6H_5 - R + HCl$, Δ is– **$FeCl_3$**	**AP-EAMCET (Medical), 2001**

Search on TG: @apna_pdf

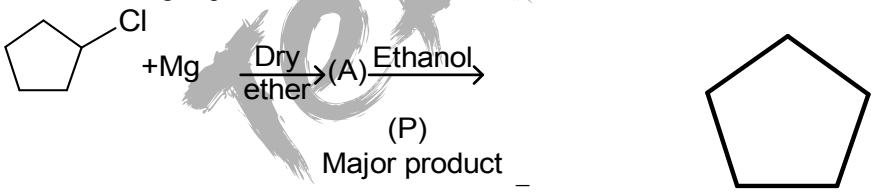
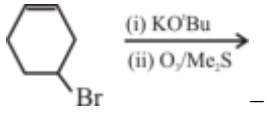
@apna_pdf

In the reaction, A and B respectively are : $C_2H_6 \xrightarrow{A} C_2H_5Cl \xrightarrow{Zn/HCl} B$ – **Cl_2/UV light and C_2H_6**	**AP-EAMCET (Medical), 2002**
Aluminium reacts with hot concentrated H_2SO_4 to liberate :– **SO_2**	**AP-EAMCET (Medical), 2002**
In this reaction, X and Y are : $2C_2H_6 + 7O_2 \xrightarrow{combustion} X + Y + Heat$ – **$4CO_2$, $6H_2O$**	**AP-EAMCET (Medical), 2002**
The major product of the synthetic reactions is $CH_3CH_2CH_3 \xrightarrow[(iii)\ Cl_2, 773K]{(i)\ Cl_2, hv \ (ii)\ alc.KOH \ (iv)\ AgOH(aq)}$ – **$CH_2 = CHCH_2OH$**	**TS-EAMCET (Engg.), 06.08.2021**
Antiknock agent in petrol– **Tetraethyl Lead**	**[AIIMS-1997]**
When chloroform is left open in air in the presence of sunlight– **Phosgene, a poisonous gas is formed**	**AIIMS-1996**
The most important method of preparation of hydrocarbons of lower carbon number is– **pyrolysis of higher carbon number of hydrocarbons**	**[AIIMS-2009]**
The size of C – C bond in benzene is– **1.39Å**	**[AIIMS-2002]**
Wet ether is not used as a solvent in Wurtz reaction, because the water present in it:– **destroy the Na metal**	**AP-EAMCET (Engg.)-2004**
The reagents that converts both acetaldehyde and acetone to alkanes– **Zn-Hg/conc. HCl**	**AP-EAMCET (Engg.)-2005**
The compounds formed at anode in the electrolysis of an aqueous solution of potassium acetate are:– **C_2H_6 and CO_2**	**AP-EAMCET (Engg.)-2005**
$CH_3CH_3 + HNO_3 \xrightarrow{675K}$ – **$CH_3CH_2NO_2 + CH_3NO_2$**	**VITEEE- 2008**
The electrode reaction that takes place at the anode of $CH_4 - O_2$ fuel cell is– **$CH_4 + 2H_2O \rightarrow CO_2 + 8H^+ + 8e^-$**	**VITEEE- 2006**
The product/s of the reaction is (are) $C_2H_5Br + 2Na + CH_3Br \xrightarrow{dryether}$ – **ethane, propane and butane**	**AMU-2014**
Among the following 1–butane (I), cis–2–butene (II), Trans–2–butene (III), the decreasing order of stability is– **III > II > I**	AMU – 2008
During debromination of meso–dibromobutane, the major product formed is– **trans–2–butene**	AMU – 2008
Compounds will be formed as a major product on treatment of 2–bromobutane with ethenolic KOH?–	**AMU–2006**
The reduction of cyanomethane using H_2/Ni yields– **ethanamine**	AMU-2004
2, 3-Dimethyl butane is obtained by catalytic hydrogenation of– **$CH_3CH = C(CH_3) - CH_3$** (with CH_3 on the C)	AMU–2003
Ethylmagnesium iodide reacts with propylamine to give– **ethane**	**Assam CEE-2014**
The correct increasing order of boiling points is– **Ethanol < butane-2-ol < butane-1-ol < pentane-1-ol**	**Assam CEE-2021**
When CH_3COOH reacts (with $CH_3 - MgX$) :– **Hydrocarbon is formed**	**BCECE-2006**
Which is present in natural gas?– **Methane**	**BCECE-2005, JCECE-2006**
Gasoline is a mixture of– **$C_7 - C_9$ alkanes**	**BCECE-2010**
 The product P is– 	**BCECE-2016**

TEAMSPY

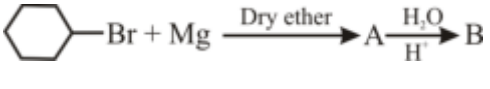
Search on TG: @apna_pdf

@apna_pdf

The compound can not be used in preparation of iodoform– **CH_3CHO**	**[BITSAT-2009]**
Sodium propionate is heated with sodalime which product is formed:– **Ethane**	**[BITSAT-2008]**
Function of $AlCl_3$ in Friedel-Craft's reaction is to– **produce electrophile**	**[BITSAT-2006], JCECE-2006**
2-bromopentane with alcoholic KOH yields a mixture of three alkenes. Which of the following alkene is predominant– **Trans-2-pentene**	**[BITSAT-2021]**
Marsh gas contains– **CH_4**	**[BITSAT – 2006] CG PET-2004**
An organic compound A (C_4H_9Cl) on reaction with Na/diethyl ether gives a hydrocarbon which on monochlorination gives only one chloro derivative, then A is– **tert-butyl chloride**	**[BITSAT – 2014]**
Acetylene reacting with HCN in presence of Ba $(CN)_2$ gives– **Vinyl cyanide**	**CG PET -2008**
Which one of the following is the best reagent to accomplish the following conversion? $CH_3CH_2Br \xrightarrow{?} CH_3-CH_3$ – **Zn|C_2H_5OH**	**CG PET- 2011**
2- chloro-3- methyl butane is treated with sodium in etherial solution, then it will give– **2, 3, 4, 5- tetramethylhexane**	**CG PET -2009**
Ethene gives with acidic $KMnO_4$ solution– **formaldehyde**	**CG PET -2007**
The reaction between an alkyl halide and sodium metal in dry ether is called– **Wurtz's reaction**	**CG PET -2004, 2005**
DDT is related to– **insecticide**	**CG PET -2006**
Tetrabromoethane on heating with Zn gives– **ethyne**	**CG PET- 2015**
How many numbers of sigma (σ) and pi (π) bonds in DDT respectively?– **21 and 6**	**GUJCET-2022**
R'- $Cl \xrightarrow{Na/ether}$ 2, 3 -dimethyl butane. What is R' in the above reaction?– **Isopropyl**	**GUJCET-2020**
In the following sequence of reactions the P is: 	**[2021, 27 Aug Shift-I]**
An organic compound 'A' C_4H_8 on treatment with $KMnO_4/H^+$ yield's compound 'B' C_3H_6O Compound 'A' also yields compound 'B' an ozonolysis. Compound 'A' is– **2-methylpropene**	(JEE Main-2021, 25 July Shift-I)
The major product(s) obtained in the following reaction is/are:  – OHC–CHO and OHC–CHO	**[JEE Main-2019, 12 April Shift-I]**
Alkyl halides reacts with dialkyl copper reagents to give:– **Alkanes**	[AIEEE 2005]
2-methyl butane on reaction with bromine in the presence of sunlight gives mainly:– **2-bromo-2-methylbutane**	[AIEEE 2005]
2-bromobutane reacts with OH^- in H_2O to give 2-butanol. The reaction involves– **racemization**	**J & K CET-(2012)**
Number of bonds present in ethene molecule– **1 pi and 5 sigma bonds**	**J & K CET-(2014)**
1-chlorobutane on reaction with alcoholic potash gives– **1-butene**	**J & K CET-(2011)**

Search on TG: @apna_pdf

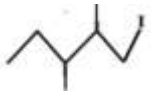
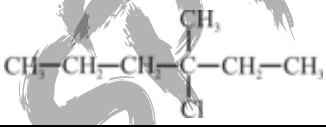
@apna_pdf

In a group of isomeric alkylhalides, the order of boiling points is– **Primary > Secondary > Tertiary**	**J & K CET-(2007)**
The reaction conditions used for converting 1,2-dibromopropane to propylene are– **Zn, alcohol/Δ**	**J & K CET-(2006)**
The reaction of chloroform and sodium hydroxide with phenol to form salicylaldehyde is called– **Reimer-Tiemann reaction**	**J & K CET-(2002)**
If chloroform is left open in the presence of sunlight, then– **poisonous phosgene gas is formed**	**J & K CET-(2003)** **JCECE-2006** **J & K CET-(2000)**
The organic reaction produce from the reaction of methyl magnesium bromide and ethyl alcohol is– **methane**	**J & K CET-(1999)**
1-Bromopropane is converted into propene in the presence of alcoholic KOH solution. The reaction involves elimination of a molecule of– **HBr**	**J & K CET-(1997)**
The alkenes gives only acetaldehyde on ozonolysis?– **2-butene**	**J & K CET-(2008)**
Bromination of alkanes involves– **Free radicals**	**J & K CET-(2005)**
Methane is produced by the hydrolysis of– **Al_4C_3**	**J & K CET-(2003)**
A fuel containing 25% n-heptane and 75% iso-octane has got octane number– **75**	**J & K CET-(2000)**
Lindlar's catalyst is– **Pd and $CaCO_3$**	**J & K CET-(2000)**
Term 'Hexadecane' in petroleum is commonly called as– **Cetane**	**J & K CET-(1997)**
At room temperature the eclipsed and staggered forms of ethane can not be isolated because– **They inter convert rapidly**	**J & K CET-(1997)** **AFMC-2010**
An alkane with a molecular formula C_6H_{14} reacts with chlorine in the presence of light and heat to give two constitutionally isomeric monochlorides of molecular formula $C_6H_{13}Cl$. The most reasonable starting alkane– **2, 3-Dimethylbutane**	**J & K CET-(2011)**
The alcohol that give positive iodoform test– **Methyl carbinol**	**JCECE - 2004** **Haryana PMT-2003**
The liquid on electrolysis produce H_2 at cathode and Cl_2 at anode– **NaC*l* solution in water**	**JCECE - 2016**
Diethyl ketone does not undergo:– **Iodoform reaction**	**JIPMER-2014** **J&K-CET, 2009**
The reagents that converts both acetaldehyde and acetone alkanes?–**Zn-Hg/conc. H**	**JIPMER-2009**
If react with Cl_2 in presence of light and then react with Na metal in dry ether, final product is–	**JIPMER-2019**
$CH_3 - Br \xrightarrow{Mg/ether} \frac{(i)\ CO_2}{(ii)\ Water} \xrightarrow[\Delta]{CH_3OH/H^+} P$, the product 'P' is the– **methyl ethanoate**	**JIPMER-2018**
Prolonged exposure of chloroform in humans may cause damage to liver. It is due to the formation of the– **$COCl_2$**	**Karnataka-CET-2020**
 The product B is–	**Karnataka-CET-2015**
Methane can be converted into ethane by– **Chlorination followed by Wurtz reaction**	**Karnataka-CET-2013**
For preparing an alkane, a saturated solution of sodium or potassium salt of a carboxylic acid is subjected to– **Electrolysis**	**Karnataka-CET-2017** **Kerala-CEE-2011**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

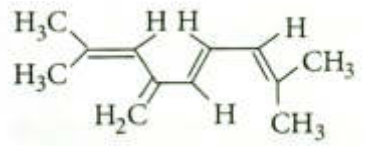
n-butylamine (I), diethylamine (II) and N, N-dimethylethylamine (III) have the same molar mass. The increasing order of their boiling point is– **III < II < I**	**Kerala-CEE-2011**
Chloroform reacts with oxygen in the presence of light to give– **Carbonyl chloride**	**Kerala-CEE-2014**
The total number of monohalogenated products formed by halogenation of 2, 4, 4-trimethylhexane are,– **6**	**Kerala-CEE-2016**
Decarboxylation of sodium propionate leads to the formation of:– **Ethane**	**Manipal-2017**
The bond line formula of 1-iodo -2, 3-dimethyl pentane is– 	**MHT CET-02.05.2019, SHIFT-III**
In the reaction, $2n\,R-X \xrightarrow[\text{Dry ether}]{+2n\,Na}$ product, The product obtained is– **n-alkane**	**MHT CET-02.05.2019, SHIFT-III**
The alkane formed on heating sodium butanoate with sodaline is– **Propane**	**MHT CET-03.05.2019, SHIFT-I**
The compound will give positive iodoform test- **Isopropyl alcohol**	**MHT CET-2017**
Chlorination of ethane is carried out in the presence of– **Ultraviolet light**	**MHT CET-2015**
'X' is an optically active alkane having lowest molecular mass. Predict the structure of the major product obtained on monochlorination of 'X'.– 	**MHT CET-2014**
The number of alkenyl groups possible from C_4H_7 are– **5**	**MHT CET-2012**
$C_6H_6 + CH_3Cl \xrightarrow{\text{Anhy.}AlCl_3} C_6H_5CH_3 + HCl$ the name of the reaction is– **Friedel-Craft Alkylation**	**MHT CET-2012, NEET-2009 BITSAT (2005)**
LPG mainly consist of the following– **Butane**	**MHT CET-2012 UPTU/UPSEE-2006**
The compounds do not give different isomers on monochlorination– **Neo-pentane**	**Odisha-NEET-2019 MHT CET-2011**
Ziegler-Natta catalyst is used for preparation of- **Preparation of high density plastic**	**MHT CET-2011**
Chloroform on reduction with zinc dust and water gives– **Methane**	**MHT CET-2009**
The correct order of boiling point for primary (1°), secondary (2°) and tertiary (3°) alcohols is– **1° > 2° > 3°**	**MHT CET-2008**
1-Chlorobutane on reaction with alcoholic potash gives– **but-1-ene**	**MHT CET-2007**
In Friedel-Crafts reaction, toluene can be prepared by– **C_6H_6+CH_3Cl**	**NEET-2000,1999**
Using anhydrous $AlCl_3$ as catalyst, which of the following reactions produces ethylbenzene (PhEt)?– **$H_2C=CH_2+C_6H_6$**	**NEET-2004**
The compounds will not undergo Friedel-Crafts reaction easily– **Nitrobenzene**	**NEET-2013 WB-JEE-2012**
Consider the nitration of benzene using mixed conc, H_2SO_4 and HNO_3. If a large amount of $KHSO_4$ is added to the mixture, the rate of nitration will be– **Slower**	**NEET-I 2016**
The shortest C–C bond distance is found in– **Acetylene**	**NEET-1991**
When $CH_3CH_2CHCl_2$ is treated with $NaNH_2$, the product formed is– **$CH_3-C\equiv CH$**	**NEET-2002**
Reactivity of hydrogen atoms attached to different carbon atoms in alkanes has the order– **teritiary > secondary > primary**	**NEET-1993**

Search on TG: @apna_pdf

@apna_pdf

In the commercial gasolines, the type of hydrocarbons that are more desirable is–**B**	**NEET-1997**
Liquid hydrocarbons can be converted to a mixture of gaseous hydrocarbons by– **Cracking**	**NEET-2010**
Hydrocarbon (A) reacts with bromine by substitution to form an alkyl bromide and by Wurtz reaction is converted to gaseous hydrocarbon containing less than four carbon atoms (A) is– **CH_4**	**NEET-2018**
The compound cannot be formed from Wurtz reaction?– **Methane**	**AIIMS-2012** **UP CPMT-2010**
Iodoform gives a precipitate with $AgNO_3$ on heating but chloroform dose not because– **C — I bond in iodoform is weak and C — Cl bond in chloroform is strong**	**UP CPMT-2008**
The reagent that converts carbonyl compounds into hydrocarbons?– **Zn–Hg/HCl**	**UP CPMT-2003**
The number of double bonds in gammexane is– 0	**UP CPMT-2002**
The number of secondary hydrogens in 2, 2-dimethyl butane is:– **2**	**UPTU/UPSEE-2004**
The anti-knocking compound is – **TEL**	**UPTU/UPSEE-2014, 2009** **NEET-1996**
The reaction of sodium ethoxide with iodoethane to form diethyl ether is termed as– **Nucleophilic substitution**	**UPTU/UPSEE-2009**
Mustard gas is a– **Poisonous gas**	**UPTU/UPSEE-2009**
$CH_3CH_2CH_3 \xrightarrow{400\text{-}600^\circ C} X + Y$. X and Y are– **Methane**	**UPTU/UPSEE-2008**
In cyclopropane, cyclobutane and cyclohexane, the common group is– $-CH_2-$	**UPTU/UPSEE-2008**
How many monobriminated product (s) (including stereoisomers) would form in the free radical bromination of n-butane?– **3**	**WB-JEE-30.04.2022**
2-methylpropane on monochlorination under photochemical condition give– **1-chloro-2-methylpropane as a major product**	**WB-JEE-2013**
The 4th higher homologue of ethane is– **Hexane**	**WB-JEE-2014**
The major products obtained during ozonolysis of 2, 3-dimethyl-1- butane and subsequent reductions with Zn and H_2O are– **methanal and 3- methyl -2-butanone**	**WB-JEE-2016**

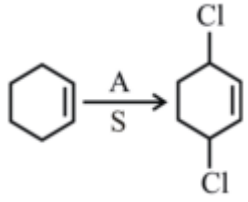
Alkenes

Calculate the number of σ and π bonds in 2-n-propylpent-1-ene– **23 σ bonds, 1π bond**	**Kerala CEE -03.07.2022**
The test used for carbon-carbon double bond in an alkene is:– **Baeyer's**	**AP-EAMCET (Med.)-1999**
The hybridization state of C atom in butendioic acid is– **sp^2**	**MHT CET-2012**
The total number of π-bond electrons in the following structure is  – **8**	**NEET-2015, cancelled**
Hybridization of C_2 and C_3 of $H_3C\text{-}CH=C=CH\text{-}CH_3$ are– **sp^2, sp**	**WB-JEE-2011**
The number of sp^3- hybridised carbon atoms in cyclohexene are– **4**	**CG PET -2004**
Hybridization of 1 and 2 carbon atom in $\overset{1}{C}H_2=\overset{2}{C}=CH_2$ are– **sp^2, sp**	**JIPMER-2005**
Compound *A* on ozonolysis yielded a mixture of propanoic acid and acetic acid	**SCRA-2015**

TEAM SPY

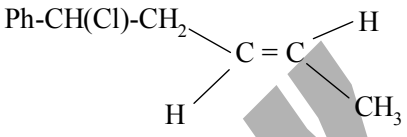
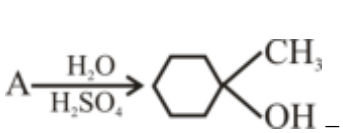
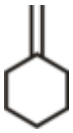
Search on TG: @apna_pdf

@apna_pdf

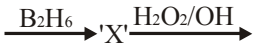
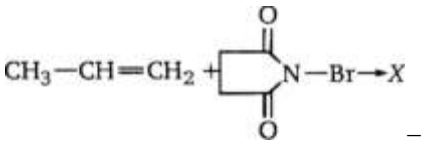
The structure of compound *A* is– **$CH_3CH_2CH = CH–CH_3$**	
The number of σ and π bonds present in ethene is:– **5σ, 1π**	**[AIIMS-1997]**
In the addition reaction of HBr to 1-butene, the first step involves the addition of– **H^+**	**SCRA-2015**
The number of σ bonds in the ethylene molecule is– **5**	A.P.EAMCET-1991
Baeyr's reagent reacts with which of the following compounds to give glycol?– **Ethylene**	A.P.EAMCET-1991
The compound formed when 2-butene is treated with acidified $KMnO_4$, is– **acetic acid**	A.P.EAMCET-1995
The structural formula of 2-methyl-2-butene is– **$CH_3 – CH = C(CH_3) – CH_3$**	A.P.EAMCET-2001
Chloroethane is treated with alc KOH. The product formed, is– **C_2H_4**	**A.P. EAMCET-1999**
The reaction conditions used for converting 1, 2-dibromoethane to ethylene are– **Zn, alcohol, Δ**	**A.P. EAMCET-2002**
The initial product of the acidic hydrolysis of cyanide is– **A primary amide**	MPPET- 2009
In the following reaction: $2CH_2 = CH_2 + S_2Cl_2 \rightarrow$ Product. The product is.– **Mustard gas**	MPPET- 2009
Towards electrophilic reagents– **Ethene is more reactive than ethyne**	MPPET- 2009
The product Z of the reaction is $H_3CC \equiv CH \xrightarrow{2HBr} Z$ – **$H_3CCBr_2CH_3$**	**TS-EAMCET-2016**
The gaseous substance that decolourises bromine but does not give a precipitate with ammoniacal silver nitrate is:– **C_2H_4**	**AP EAMCET (Medical) - 1998**
 Identify the reagent 'A' and condition(s) for the reaction– **$A = Cl_2$; UV light**	**JEE Main 16.03.2021, Shift-II**
Optically active $CH_3-\underset{OH}{\underset{\vert}{CH}}-CH_2-CH_3$ was found to have lost its optical activity after standing in water containing a few drops of acids, mainly due to the formation of– **CH_3 - CH = CH - CH_3**	**TS EAMCET-2017**
The substrate in this reaction: ? $\xrightarrow[443K]{H_2SO_4}$ $H_2C=CH_2$ – **Ethyl alcohol**	**AP EAPCET-6 Sep. 2021, Shift-II**
The compound gives sooty flame on combustion?– **C_6H_6**	**AP EAMCET (Engg.) -2014**
$CH_3-CH_2-OH \xrightarrow{A} CH_3-CH_2-Cl \xrightarrow{B} CH_2=CH_2$ A and B in this sequence of reaction are– **PCl_5 and $KOH_{(alc.)}$**	**COMEDK 2012**
Markovnikov's rule is applicable to– **alkene**	**COMEDK 2012**
The main product in the reaction $C(CH_3)_3OH \xrightarrow[358K]{20\%H_3PO_4} ?$ – **$(CH_3)_2C = CH_2$**	**COMEDK 2015**
The compound that on ozonolysis produces a mixture of propanone and ethanal is– **2-methylbut-2-ene**	**COMEDK 2014**
One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having a molecular mass of 44 u. The alkene is– **2-butene**	**COMEDK-2017**
A reagent used to test for unsaturation in alkenes is– **Solution of Br_2 in CCl_4**	**COMEDK 2018**
The reactions that yield 2E-butene as the major product?– **$CH_3-C\equiv C-CH_3 + Na/NH_3\,(liq.)$**	**AP-EAMCET (Medical), 2008**

Search on TG: @apna_pdf

@apna_pdf

Acetylene has ..... bonds:– **3σ, 2π**	**AP-EAMCET (Medical), 2001**
$CH_3CH = CHC(Cl)(CH_3)_2$ is which type of halide based on position of –Cl- **Allylic**	**GUJCET-2021**
The reaction $CH_2 = CH_2 + H_2 \xrightarrow[300^oC]{Ni} CH_3 - CH_3$ – **Sabatier – Sender's reaction**	**TS EAMCET 05.08.2021, Shift-I**
The major product of the reaction is: $CH_3CH_2CH = CH_2 \xrightarrow[Rh\,catalyst]{H_2/CO}$ – **$CH_3CH_2CH_2CHO$**	**JEE Main 25.02.2021, Shift-II**
The formation of 2-butene as a major product by dehydration of 2-butanol is in accordance with– **Saytzeff's rule**	**AIIMS-1994 CGPET-2005, 2007**
In the reaction, $Ph–CH_2–CH_2–C \equiv C–CH_3 \xrightarrow{Na/NH_3} A \xrightarrow{Cl_2/hv} B$, B is – 	**[AIIMS-26 May, 2018 (E)]**
The alkene that will give the same product with HBr in the absence as well as in the presence of peroxide is– **2-butene**	**[AIIMS-2016]**
The alkene $R–CH=CH_2$ reacts readily with B_2H_6 and formed the product B which on oxidation with alkaline hydrogen peroxide produces– **$R–CH_2–CH_2–OH$**	**AIIMS-2010, 1995**
Propene on hydroboration and oxidation produces– **$CH_3CH_2CH_2OH$**	**[AIIMS-2007]**
The major product obtained on treatment of $CH_3CH_2CH(F)CH_3$ with CH_3O^-/CH_3OH is:– **$CH_3CH = CHCH_3$**	**[AIIMS-2005]**
The treatment of benzene with isobutene in the presence of sulphuric acid gives:– **tert-butylbenzene**	**VITEEE-2019 AIIMS-2003**
Geometrical isomerism is possible in case of:– **2-butene**	**[AIIMS-1999]**
$C_2H_6 \xrightarrow{450^oC} C_2H_4 + H_2$ Above reaction is called as– **pyrolysis**	**AP-EAMCET (Engg.) 2013**
An alkene of molecule formula C_9H_{18} on ozonolysis gives 2, 2-dimethylpropanal & 2-butanone, then the alkene is– **2, 2, 4-trimethyl-3-hexene**	**VITEEE-2019**
HBr reacts with $CH_2 = CH – OCH_3$ under anhydrous conditions at room temperature to give– **$H_3C – CHBr – OCH_3$**	**AIEEE-2006**
How many sigma and pi-bonds are there in the molecule of dicyanoethene (CN–CH=CH–CN)?– **7 sigma and 5 pi**	**VITEEE-2014**
Hydroboration oxidation of 4-methyl-octene would give– **4-methyl octanol**	**VITEEE- 2008**
The reaction that we find α, β– unsaturated carbonyl compounds undergoing a ring closure reaction with conjugated dienes?– **Diels-Alder reaction**	**VITEEE- 2007**
Ziegler catalyst to manufacture polyethylene is made by the reaction– **$TiCl_4$ with $Al(CH_3)_3$**	**AMU-2017**
In the given reaction, A may be  	**AMU-2013**
In the following reaction, $RCH_2CH = CH_2 + ICl \rightarrow$ [A] Markownikoff's product $RCH_2\underset{Cl}{CH}–CH_2I$ [A] is–	AMU – 2009

TEAM SPY
Search on TG: @apna_pdf
@apna_pdf

In the sequence of reaction below the compound 'C' is– **butan-2-one**	**AMU–2006**
In the sequence of reaction , 'X'  'Y' the product 'Y' is– **butan –1– o1**	**AMU–2006**
Propene when heated with chlorine at about 500°C form.– **CH_2Cl—CH=CH_2**	**AMU 2002**
2- bromobutane reacts with alcoholic KOH then the product is– **Predominantly 2-butene**	**Assam CEE-2019**
The most stable alkene is :– **$R_2C = CR_2$**	**BCECE-2004** **AIIMS-1998**
The product 'X', in the reaction is :  – **$CH_2Br – CH = CH_2$**	**BCECE-2003**
Ethyl chloride on treatment with alcoholic alkali gives– **C_2H_5OH**	**BCECE-2009**
In the preparation of alkene from alcohol using Al_2O_3 is effective factor?– **Temperature**	**BCECE-2012** **NEET-2003** **BITSAT-2006**
The product in the reaction? –	**BITSAT – 2011** **BHU-2005**
The intermediate formed during the addition of HCl to propene in the presence of peroxide is– **$CH_2\overset{+}{C}HCH_3$**	**[BITSAT- 2009]**
Compounds (A) gives two mole acetone and glyoxal on ozonolysis?– **2,5- dimethyl hexa-2,4-diene**	**CG PET- 2016**
The olefin that on ozonolysis gives CH_3CH_2CHO and CH_3CHO is– **2- pentene**	**CG PET- 2016**
Butene-2 $\xrightarrow[2.alc.KOH,\Delta]{1.Br_2}$ [A] $\xrightarrow[H_2O]{O_3}$ [B] Compounds A and B are– **Butyne-2acetic acid**	**CG PET -2019, 2021**
Propyne and propene can be distinguished by– **$AgNO_3$ in ammonia**	**CG PET- 2012**
$C_2H_2 \xrightarrow[H_2SO_4,H_2O]{Hg^{2+}} A \xrightarrow{[O]} B$ The compound B is– **an acid**	**CG PET- 2012**
The addition of HBr is easiest with– **$(CH_3)_2C = CH_2$**	MPPMT-2000
Alkene which on ozonolysis yields acetone, is– **$(CH_3)_2$–C = C–(CH_3)**	CGPET-2012
Baeyer's reagent decolourises- **Alkene and alkyne both**	**CG PET -2006**
The conversion of cis-1 2-dichloroethene to trans-1,2- dichloroethene is an example of– **unimolecular reaction**	**CG PET -2017**
In the reaction, $CH_3COOH \xrightarrow{LiAlH_4} A \xrightarrow{PCl_5} B \xrightarrow{alc.KOH} C$ the product C is– **ethylene**	**JEE Main -2014**
One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having a molecular mass of 44 u. The alkene is– **2-butene**	**AIEEE 2010, 2008**
Acetylene does not react with:– **NaOH**	**AIEEE 2002** JIPMER-2016
Acetylene reacts with hypochlorous acid to form– **$ClCHCHO$**	**AIEEE 2002** UP CPMT-2012

Search on TG: @apna_pdf

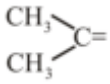
@apna_pdf

2-hexyne gives trans-2-hexene on treatment with:– **Li/NH_3**	**AIEEE 2012, 2004** JEE Main-2018
Elimination of bromine from 2-bromobutane results in the formation of:– **Predominantly 2-butene**	[AIEEE 2005]
Reaction of one molecule of HBr with one molecule of 1, 3-butadiene at 40ºC gives predominantly:– **1-bromo-2-butene under thermodynamically controlled conditions**	[AIEEE 2005]
The reaction of propene with HOCl (Cl_2 + H_2O) proceeds through the intermediate:– $CH_3\overset{+}{C}HCH_2Cl$	**[JEE Main 2016]**
But-2-ene on reaction with alkaline $KMnO_4$ at elevated temperature followed by acidification will give:– **2 molecules of CH_3COOH**	**[JEE Main-2019, 12 April Shift-I]**
Butene-1 may be converted to butane by reaction with:– **Pd/H_2**	[AIEEE 2003]
The major product obtained from E_2 –elimination of 3-bromo-2-fluoropentane is:– $CH_3CH_2CH=\underset{\displaystyle CH^3}{\overset{\displaystyle |}{C}}-F$	**[JEE Main-2020, 2 Sep Shift-II]**
Ethylene can be converted into alcohol by treatment of– **H_2SO_4 as catalyst**	**J & K CET-(2014)**
Allene (C_3H_4) contains– **two double and four single bonds**	**J & K CET-(2017) UPTU/UPSEE-2005**
Addition of HI on the double bond of propene isopropyl iodide and not n-propyl iodide as the major product. This is because the addition proceeds through– **a more stable carbonium ion**	**J & K CET-(1998)**
Reaction between propene and HCl to form isopropyl chloride takes place through– **electrophilic addition reaction**	**J & K CET-(2010)**
But-2-ene could exist as– **geometrical isomers**	**J & K CET-(2002)**
The major product is when pent-1-ene reacts with HCl– **2-chloropentane**	**J & K CET-2002**
The compound does not react with ammoniacal $AgNO_3$, but decolourises bromine water– **C_2H_4**	**J & K CET-(2002)**
The general molecular formula for a cycloalkyl group is– **C_nH_{2n-1}**	**J & K CET-(2002) UPCPMT-2013**
If ozonolysis of an organic compound A yields acetone and propionaldehyde, then A is– **2-methyl-2 pentene**	**J & K CET-(2001)**
The preparation of ethene from ethanol can be described as– **dehydration**	**J & K CET-(1999)**
For the industrial manufacture of high density polyethylene, the main process that is generally adopted is– **Zeigler-Natta or oxide catalysed polymerisation**	**J & K CET-(2001)**
Which of the following reagents when heated with ethyl chloride, forms ethylene?– **Alcoholic KOH**	**JCECE - 2009 AP EAMCET-2006**
Ziegler-Natta catalyst is– **[$Al_2(C_2H_6)_6$ + $TiCl_4$]**	**JCECE - 2010 WBJEE-2009 UPTU/UPSEE-2014**
Anti-Markownikoff's addition of HBr is not observed in– **but-2-ene**	**JCECE - 2011 J & K CET -2012, 1998 Manipal-2016 NEET-1994 BCECE-2005**
An alkene 'A' contains three C—C, eight C—H σ-bonds and one C—C-π bond. 'A' on ozonolysis gives two moles of an aldehyde of molar mass 44u. IUPAC name of A is– **but-2-ene**	**JCECE - 2013**

JEAM SIR

Search on TG: @apna_pdf

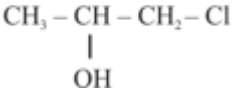
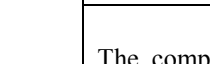
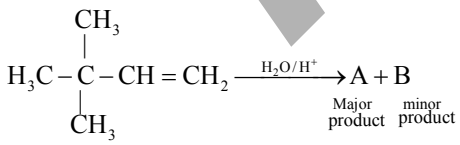
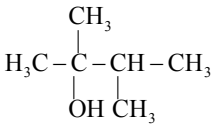
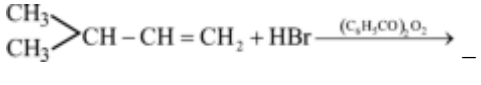
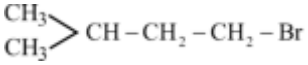
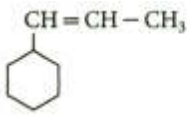
@apna_pdf

One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having a molecular mass of 44u. The alkene is– **but-2-ene**	**JCECE - 2013**
The statements is not true about low density polythene– **Highly branched structure**	**JCECE - 2013**
The main product of the reaction would be 2-butene + chloroform $\xrightarrow{NaOH}$?– **2-methyl butanoic acid**	**JCECE - 2014**
Acid catalysed hydration of alkenes except ethene leads to the formation of– **secondary or tertiary alcohol**	**JCECE - 2017**
Catalyst used in hydrogenation is– **Ni**	**JCECE - 2018**
The major product in the reaction of HOBr with propene?– **1-bromo, 2-propanol**	**JIPMER-2017** **JCEC-2010**
The reaction of HBr with  $= CH_2$ in the presence of peroxide will give:–	**JIPMER-2006**
What is obtained, when potassium succinate solution is electrolysed?– **Ethene**	**JIPMER-2004**
$CH_3 - CH_2 - CH_2 - Br \xrightarrow{Alc.KOH}$ Final product is– **propene**	**JIPMER-2019**
Polypropylene can be obtained by polymerization of– **CH_3–CH = CH_2**	**JIPMER-2016**
Ziegler-Natta catalyst is used to prepare– **high density polythene**	**Karnataka-CET-2018** **Kerala CEE-2011**
n-propyl bromide on treating with alcoholic KOH produces– **propene**	**Karnataka-CET, 2008**
Peroxide effect is observed with the addition of HBr but not with the addition of HI to unsymmetrical alkene because– **H-I bond is weaker than H-Br bond so that Iodine free radicals combine to form iodine molecules**	**Kerala-CEE-29.08.2021** **Karnataka CET-2021**
The alkene that will give the same product with HBr in the absence as well as in the presence of peroxide is– **2-butene**	**Kerala-CEE-2010**
An alkene on reductive ozonolysis gives 2-molecules of $CH_2(CHO)_2$. The alkene is:– **1, 4-cyclohexadiene**	**Kerala-CEE-2006**
An alkene having the molecular formula C_9H_{18} on ozonolysis gives 2, 2-dimethyl propanal and 2-butanone. The alkene is:– **2, 2-dimethyl-1-3 heptene**	**Kerala-CEE-2005** **VITEEE-2019**
The presence of Ag^+ ion increases the solubility of alkenes due to the formation of:– **pπ-dπ bonding**	**Kerala-CEE-2004**
The correct statement concerning the structure of CH_2= C= CH_2:– **The molecule is non-planar with the two – CH_2 groups being in planes perpendicular to each other**	**Kerala-CEE-2004**
When 3-phenylpropene reacts with HBr in the presence of peroxide, the major product formed is– **1-bromo 3-phenylpropane**	**Kerala-CEE-2011**
When HBr adds on hex-1-ene in the presence of benzoyl peroxide, the product is– **1-bromohexane**	**Kerala-CEE-2012**
One mole of alkene on ozonolysis gives 2 moles of butanone. The alkene is– **3,4-dimethylhex-3-ene**	**Kerala-CEE-2013**
The products obtained by the ozonolysis of 2-ethylbut-1-ene are– **methanal and 3-pentanone**	**Kerala-CEE-2014**
The major product obtained by the addition reaction of HBr to 4-methylpent-1-ene in the presence of peroxide is– **1-bromo-4-methylpentane**	**Kerala-CEE-2016**

TeAPSY

Search on TG: @apna_pdf

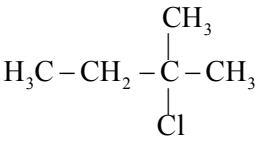
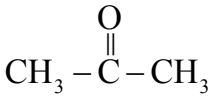
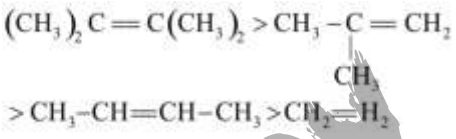
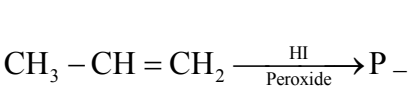
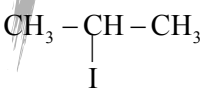
@apna_pdf

The neopentyl halide in ethanol yields alkenes by E1 mechanism due to– **steric factor which prevents E2 mechanism**	**Kerala-CEE-2019**
Propylene on treatment with HBr/H_2O_2 provides– **1-bromopropane**	**Kerala-CEE-2019**
The products obtained by the ozonolysis of 2-methylbut-1-ene are– **butanone and methanal**	**Kerala-CEE-2020**
The catalyst used in the Wacker process of oxidation of ethyne to ethanol is– **$PdCl_2$**	**Kerala-CEE-2020**
The major product of the following reaction is $CH_2=CH-CH_2-OH \xrightarrow[\text{excess}]{HBr}$ product– **$CH_3-CHBr-CH_2Br$**	**Kerala-CEE-29.08.2021**
For the reaction, $CH_3-CH=CH_2 + HOCl \rightarrow$A The product A is :– 	**Manipal-2019**
α - butylene when subjected to hydroboration oxidation reaction, yields– **n-butyl alcohol**	**MHT CET-02.05.2019, SHIFT-III**
For synthesis of 1-butene, CH_3MgI should be treated with– **allyl chloride**	**MHT CET-2007**
The true statement about benzene amongst the following– **there is cyclic delocalisation of π-electrons in benzene**	**NEET-1992**
Electrophile in the case of chlorination of benzene in the presence of $FeCl_3$ is– **Cl^+**	**NEET-1996**
When acetylene is passed through dil, H_2SO_4 in the presence of $HgSO_4$, the compound formed is– **acetaldehyde**	**NEET-1999**
The restricted rotation about carbon carbon double bond in 2-butene is due to– **sideways overlap of two p-orbitals**	**NEET-1993, 2000**
The reaction, $CH_2=CH-CH_3+HBr \longrightarrow CH_3CHBr-CH_3$ is– **electrophilic addition**	**NEET-1996**
The compound has zero dipole moment **trans-2-Butene**	**NEET-1996**
The reagent that converts propene to 1-propanol **B_2H_6, H_2O_2, OH^-**	**NEET-2000**
Which is maximum stable **trans-2-Butene**	**NEET-2000**
The compound,  on reaction with $NaIO_4$ in the presence of $KMnO_4$ gives– **$CH_3COCH_3 + CH_3COOH$**	**NEET-2003**
In the following reaction  The major product is– 	**NEET-2012**
The major product of the following chemical reaction is  	**NEET-2021**
An alkene on ozonolysis gives methanal as one of the product. Its structure is– 	**NEET-2020**

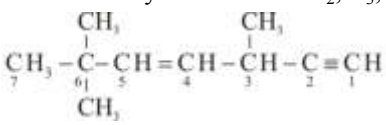
TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

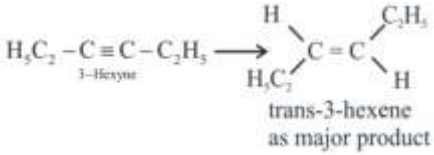
An alkene A on reaction with O_3 and $Zn–H_2O$ gives propanone and ethanal in equimolar ratio. Addition of HCl to alkene A gives B as the major product. The structure of product B is– 	**NEET-2019**
Write the final product of the following reaction: $CH_3\text{-}CH=CH_2+H_2O\xrightarrow[50°C]{PdCl_2/CuCl_2}-$ 	**Tripura JEE-2022**
When $CH_2 = CH - COOH$ is reduced with $LiAlH_4$, the compound obtained will be– **$CH_2 = CH - CH_2OH$**	**UPTU/UPSEE-2007**
The correct decreasing order of ease of addition of halogen– 	**UPTU/UPSEE-2012**
An alkene having molecular formula, C_6H_{10}, gives $OHC-(CH_2)_4-CHO$, on ozonolysis, The alkene is– **cyclohexene**	**UPTU/UPSEE-2010**
The major product of the following reaction is $F_3C - CH = CH_2 + HBr \rightarrow$ **$F_3C — CH_2 — CH_2Br$**	**WB-JEE-30.04.2022** **JEE Main – 2019**
The major product *p* in the following reaction is  	**WB-JEE-2008**
The addition of HBr to 2- pentene gives– **2-bromopentane and 3-bromopentane**	**WB-JEE-2009**
In 2-butene, the true statements is– **$C_1 – C_2$ bond is a $sp^3 – sp^2 –$ σ-bond**	**WB-JEE-2012**
Ozonolysis of an alkene produces only one dicabonyl compound. The structure of the alkene is–	**WB-JEE-2016**
The number of possible organobromine compounds which can be obtained in the allylic bromination of 1-butene with N-bromosuccinimide is– **4**	**WB-JEE-2018**

Alkynes

The compounds liberates hydrogen gas on reacting with sodium metal– **C_2H_2**	**AP-EAMCET (Med.)-1999**
In the hydrocarbon $CH_3C \equiv C - CH_3$, hybridisation of carbon atoms in the molecule from left to right are respectively– **sp^3, sp, sp and sp^3**	**SRMJEEE – 2013**
In the compound $CH_2 = CH - CH_2 - CH_2 - C \equiv CH$, the pair of hybridized involved in the formation of $C_2 – C_3$ bond is– **$sp^2 – sp^3$**	**Assam CEE-2020**
The state of hybridization of C_2, C_3, C_5 and C_6 of the hydrocarbon,  is in the following sequence– **sp, sp^3, sp^2 and sp^3**	**NEET-2009**

Search on TG: @apna_pdf

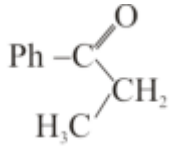
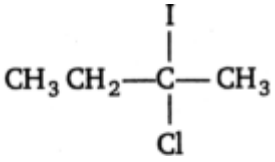
@apna_pdf

Consider the following transformation :  trans-3-hexene as major product The suitable reagents is for the above transformation?– **Na, NH_3(liq)**	**SCRA-2015**
Dilute $KMnO_4$ oxidises acetylene to– **oxalic acid**	**A.P.EAMCET-1992**
The number of sp and sp^2 carbon in Hepta-1, 3-dien-5-yne, respectively, are– **2, 4**	**TS EAMCET 04.08.2021, Shift-I**
The hybridization of carbon atoms in C – C single bond of $HC \equiv C - CH = CH_2$ is– **sp-sp^2**	**J & K CET-(2003)**
The hybridisation involved in acetylene is– **sp**	**A.P.EAMCET-1993**
In the following reaction sequence, $CaC_2 \xrightarrow{H_2O} P \xrightarrow{\text{Hot-iron}} Q \xrightarrow[AlCl_3]{CH_3Cl} R$ the product R is– **toluene**	**A.P.EAMCET-1995**
The number of π bonds in the product formed by passing acetylene through dil. H_2SO_4 containing mercuric sulphate is– **one**	**A.P.EAMCET-1997**
The homologue of ethyne is– **C_3H_4**	**JIPMER-2009 UP CPMT-2008 AP-EAMCET (Medical)-2006, 1998**
A gas decolourises Br_2 in CCl_4 and forms a precipitate with ammonical silver nitrate. The gas is– **C_2H_2**	**A.P.EAMCET-1998**
The number of C – C sigma bonds present in 1–butyne is– **3**	**A.P.EAMCET-1999**
The number of acetylene molecules required to form one molecule of benzene is– **3**	**A.P.EAMCET-1999**
Hydrocarbons has least carbon-carbon bond length is– **C_2H_2**	**A.P.EAMCET-2000**
The reagent used for converting acetylene to oxalic acid is– **$KMnO_4$/KOH, 25°C**	**A.P.EAMCET-2002**
The reaction is an example of .....reaction $C_2H_4Br_2 \xrightarrow{\text{Alc.KOH}} C_2H_2$ – **dehydrobromination**	**A.P.EAMCET-2004**
Action of zinc dust on tetrabromo ethane gives– **CH ≡ CH**	**A.P. EAMCET-1996**
Ethylene reacted with bromine in CCl_4 to form X. X is treated with alcoholic KOH to give Y. X and Y are respectively– **$BrCH_2$—CH_2Br and C_2H_2**	**A.P. EAMCET-2000**
Ethyne is treated with 30% H_2SO_4 in the presence of 1% mercuric sulphate at 70°C. the product formed is– **Ethanal**	**A.P.EAMCET/1999**
Ammonical cuprous chloride will give red precipitate with which one of the– **$CH_3 - C \equiv CH$**	**MPPET-2008**
Reaction of acetylene with water in the presence of H_2SO_4 and $HgSO_4$ gives:– **Acetadehyde**	**SCRA - 2009**
The number of sigma and pi bonds in pent-2-yne is– **12 and 2**	**COMEDK 2012**
Ethylene can be separated from acetylene by passing the mixture through– **ammonical Cu_2Cl_2**	**WB-JEE-2009**
Acetylene and HCHO react in presence of copper acetylide catalyst to form:– **2-butyne-1, 4-diol**	**AP-EAMCET (Medical), 2006**
In the reaction $C_2H_2 \xrightarrow[HgSO_4/H_2SO_4]{H_2O\ 60^0C} X \rightleftharpoons CH_3CHO$ What is X?– **H_2C = CHOH**	**AP-EAMCET (Medical), 2001**
Acetylene gas is passed through ..... solution, a white precipitate is formed :–**Am**	**AP-EAMCET (Medical), 2002**

JEAMSPY

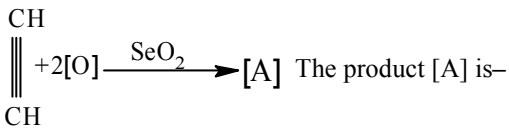
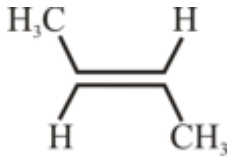
Search on TG: @apna_pdf

@apna_pdf

In the reaction, X and Y are respectively : $C_2H_2 \xrightarrow{X} C_6H_6 \xrightarrow{Y} C_6H_5SO_3-$ **red hot iron tube, fuming H_2SO_4**	**AP-EAMCET (Medical), 2002**
Propyne is passed through a red hot iron tube at 873K, the reaction gives product having molecular formula of– **C_9H_{12}**	**TS EAMCET 04.08.2021, Shift-I**
Ozonolysis of acetylene gives– **CHO – CHO**	**AIIMS-1996**
The end product (C) in the following sequence of reactions $HC \equiv CH \xrightarrow[20\%\ H_2SO_4]{1\%HgSO_4} A \xrightarrow[H_2O]{CH_3MgX} B \xrightarrow{[O]} (C)-$ **acetone**	**AIIMS-2017, 1997** **CG PET-2004**
Predict the nature of P in the following reaction $CH_3C \equiv CCH_3 \xrightarrow[heat]{NaNH_2\ /\ inert\ solvent} P-$ **$CH_3CH_2C \equiv CH$**	**[AIIMS-2014]**
1-Butyne can be distinguished most easily from 2-butyne by– **Tollen's reagent**	**AIIMS-2011** **NEET Mains-2012** **BCECE-2003]** **JIPMER-2005**
Mg_2C_3 gives on hydrolysis– **Propyne**	**[AIIMS-2005]**
With ammonical cuprous chloride solution, a reddish brown precipitate is obtained on treating with:– **C_2H_2**	**[AIIMS-2001]**
Alkynes usually show of reaction– **Addition**	**AIIMS-1999**
1-Butyne and cold alkaline [$KMnO_4$] react to produce:– **$CH_3CH_2COOH + CO_2$**	**[AIIMS-1997]**
Chloroform heated with silver powder gives.– **CH ≡ CH**	AP- EAMCET(Medical) - 2010
The number of σ and π bonds present in 1-butene-3-yne is– **7 and 3**	**AP - EAMCET(MEDICAL) - 2009**
The number of π–bonds in the product formed by passing acetylene through dil. H_2SO_4 containing mercuric sulphate is:– **one**	**AP – EAMCET - (Medical)-1997**
$Ph-C \equiv C-CH_3 \xrightarrow{Hg^{2+}/H^+} A-$ 	**VITEEE-2014** **J&K CET (2004)**
Consider following reaction, $HC \equiv CH \xrightarrow[H_2SO_4]{Hg^{2+}/HgSO_4} X \xrightarrow{CH_3MgBr} Y \xrightarrow{H_3C^+} Z$ The compound 'Z' is– **2– Propanol**	**AMU–2006**
In the reaction sequence $HC \equiv CH \xrightarrow[ether]{NaNH_3} 'A' \xrightarrow[ether]{CH_3CH_2CH_2Br} 'B'$ the product 'B' is– **1-pentyne**	AMU-2004
The correct description of bonds in acetylene molecule is– **3σ, 2π**	**Assam CEE-2020**
Which of the following will react with hex-2-yne to produce trans-hex-2-ene?– **$LiAlH_4$**	**Assam CEE-2021**
$CH_3C \equiv CH \xrightarrow[+Hg^{2+},60^0C]{H_2SO_4} ?-$ **CH_3COCH_3**	**BCECE-2009**
The product 'C' obtained in the following reaction of butyne–1 $CH_3CH_2-C \equiv CH + HCl \longrightarrow B \xrightarrow{HI} C-$ 	**BCECE-2012** **NEET-2007**

Search on TG: @apna_pdf

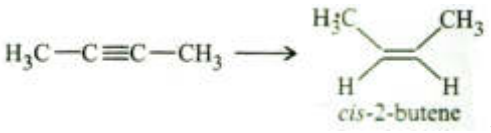
@apna_pdf

Product of reaction sequence of alkene $CH_3CH = CHCH_3 \xrightarrow{O_3} A \xrightarrow[Zn]{H_2O} B$ The product B is– **CH_3CHO**	**BCECE-2015**
The product is obtained when 1-butyne reacts with excess of HBr– **2, 2-dibromobu**	**BCECE-2018**
The most suitable catalyst for the hydrogenation of 2 – Hexyne $\longrightarrow$ 2 – cis-Hexene is– **Pd-$BaSO_4$**	**[BITSAT – 2007]**
The main product when acetylene reacts with hypochlorous acid– **Dichloroacetaldehyde**	**[BITSAT – 2013]**
The degree of unsaturation of C_6H_5 and butyne-2 respectively are– **4 and 2**	**CG PET- 2016**
Consider the following reaction  The product [A] is– **CHO-CHO (glyoxal)**	**CG PET -2017**
The hydrocarbon that can react with sodium in liquid ammonia is:– **Alkyne**	**[AIEEE 2008]**
The treatment of CH_3MgX with $CH_3C{\equiv}C–H$ produces– **CH_4**	**[AIEEE 2008]**
The major organic compound formed by the reaction of 1,1,1-trichloroethane with silver powder is:– **2–butyne**	**[JEE Main 2014]**
The major product of the following reaction is: $CH_3C{\equiv}CH \xrightarrow[(ii)\ DI]{(i)\ DCl(1equiv.)} –$ **$CH_3C(I)(Cl)CHD_2$**	**[JEE Main-2019, 9 April Shift-I]**
1- Butyne on hydration gives:– **bute-2-one**	**J & K CET-(2008)**
The major product in the reaction of 2-butyne with Li/Liq. NH_3 is– 	**J & K CET-(2006)**
The number of sigma and Pi-bonds in but-l-en-3-yne are– **7 sigma and 3 pi**	**JEE Main -2014**
Products of the reaction are : $CH_3C \equiv CCH_2CH_3 \xrightarrow[(ii)\ hydrolysis]{(i)\ O_3} –$ **$CH_3COOH + HOOC\ CH_2CH_3$**	**J & K CET-1999** **NEET-2005**
Calcium carbide reacts with H_2O to produce– **acetylene**	**JCECE - 2007** **JIPMER-2010**
Alkynes occur in nature in– **not in free state**	**JCECE - 2013**
$CH_3 – C \equiv CH$ $\xrightarrow[1\%\ HgSO_4]{40\%\ H_2SO_4} A \xrightarrow{Isomerisation} CH_3COCH_3$ Structure of A and the type of isomerism in the reaction are respectively– **prop-1-en-1-ol, tautomerism**	**JCECE - 2013** **NEET-2017**
What is the best way to carry out the following transformation? 1- pentyne $\rightarrow$ pentanal– **BH_3; H_2O_2/NaOH**	**JCECE - 2014**
The hydrocarbon that can react with sodium in liquid ammonia is– **acetylene**	**JCECE - 2017**
2-butyne is treated with pd-$BaSO_4$; the product formed will be– **cis-2-butene**	**JCECE - 2017**

TEAM SPY

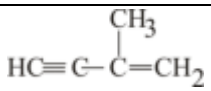
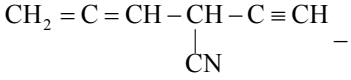
Search on TG: @apna_pdf

@apna_pdf

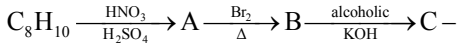
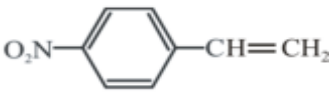
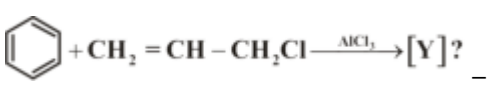
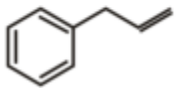
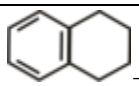
On warming with silver powder, chloroform is converted into– **acetylene**	**JIPMER-2012**
Propyne on passing through red hot copper tube forms– **mesitylene**	**JIPMER-2012** **Kerala CEE-2004**
$\begin{matrix}CH\\\|\|\|\\CH\end{matrix}$ reacts with acetic acid in presence of Hg^{2+} to give:– $\begin{matrix}CH_3\\\|\\CH(CH_3COO)_2\end{matrix}$	**JIPMER-2006**
3-bromo 2-methyl butane is treated with sodium ethoxide in ethanol, what will be the major product?– **2-methyl but-2-ene**	**JIPMER-2016**
2-butyne is reduced to trans-but-2-ene using– **Na in liq.NH_3**	**Karnataka-CET-2019** **Kerala CEE-2014** **NEET-1993**
n-propyl chloride reacts with sodium metal in dry ether to give– **$CH_3–CH_2–CH_2–CH_2–CH_2–CH_3$**	**Karnataka-CET-2018**
Number of possible alkynes with formula C_5H_8 is– **3**	**Karnataka-CET-2015** **UPTU/UPSEE-2008, 2014**
In acetylene molecule, between the carbon atoms there are– **one sigma and two pi bonds**	**Karnataka-CET-2007**
Ethylidene dichloride is obtained by the reaction of excess of HCl with–**acetylene**	**MHT CET-2009**
Acetylenic hydrogen are acidic because– **sigma electron density of C–H bond in acetylene is nearer to carbon, which has 50% s-character**	**NEET-1989**
A compound is treated with $NaNH_2$ to give sodium salt. the compound is– **C_2H_2**	**NEET-1993**
The cylindrical shape of an alkyne is due to– **one sigma C – C and two π C–C bonds**	**NEET-1997**
In the reaction, $H_3C-C\equiv CH \xrightarrow[873\ K]{\text{red hot iron tube}} A$, the number of sigms (σ) bonds present in the product A, is– **21**	**Odisha NEET 2019**
The correct order of acidity **$CH\equiv CH > CH_3-C\equiv CH > CH_2=CH_2 > CH_3-CH_3$**	**NEET-2017**
The pair of electrons in the given carbanion, $CH_3C\equiv C^-$, is present in the orbitals– **sp**	**NEET-I 2016**
In the reaction : $HC\equiv CH \xrightarrow[Hg^{2+}]{H_2SO_4}$ 'p' product 'p' will not give– **Victor Meyer test**	**Karnataka NEET 2013**
The most suitable reagent for the conversion is  – **H_2, Pd/C, quionline**	**NEET-2019**
The bond length between hybridised carbon atom and other carbon atom is minimum in– **alkyne**	**NEET-1996**
$CH_3-C\equiv C-CH_3 \xrightarrow[(ii)CH_3CH_2COOH,0\ °C]{(i)B_2H_6/THF} Y$ Compound Y will be– **cis-2-butene**	**Tripura JEE-2019**
The product formed when acetylene reacts with hypochlorous acid?– **Cl_2CH CHO**	**UP CPMT-2012**
Acetylene reacts with HCN in the presence of Ba $(CN)_2$ to yield:– **Vinyl cyanide**	**UPTU/UPSEE-2004**
Lewisite, a chemical used in chemical warfare, is obtained from– **acetylene**	**UPTU/UPSEE-2010**

Search on TG: @apna_pdf

@apna_pdf

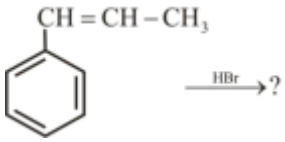
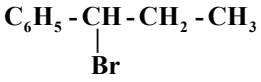
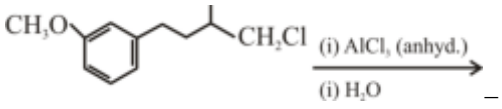
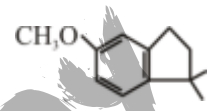
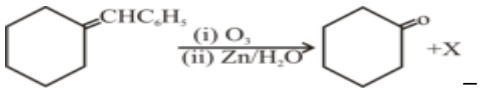
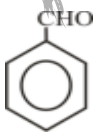
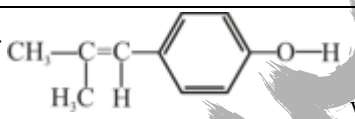
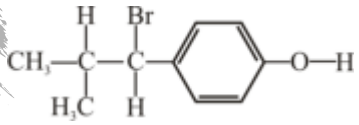
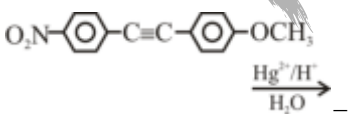
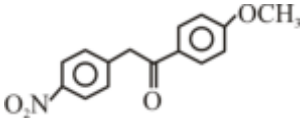
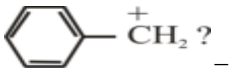
The acetylene is passed through dil H_2SO_4 in presence of $HgSO_4$, the compound formed is– **acetaldehyde**	**UPTU/UPSEE-2009**
Ammonical silver nitrate form a white precipitate easily with– **$CH_3C \equiv CH$**	**UPTU/UPSEE-2008**
CH_3–C≡C MgBr can be prepared by the reaction of– **$CH_3 - C \equiv CH$ with CH_3MgBr**	**WB-JEE-2018**
In the hydrocarbon, $\overset{6}{C}H_3 - \overset{5}{C}H = \overset{4}{C}H - \overset{3}{C}H_2 - \overset{2}{C} \equiv \overset{1}{C}H$ The state of hybridization of carbons 1, 3 and 5 are in the following sequence– **sp, sp^3, sp^2**	**NEET-2008**
A straight chain hydrocarbon has the molecular formula C_8H_{10}. The hybridization of the carbon atoms from one end of the chain to the other are respectively sp^3, sp^2, sp^2, sp^3, sp^2 , sp^2 , sp and sp. The structural formula of the hydrocarbon would be– **$CH_3CH \equiv CHCH_2$ - CH = CHC ≡ CH**	**NEET-1991**
The correct sequence of hybridization of methane, ethene and acetylene is– **sp^3,sp^2,sp**	**UP CPMT-2003**
In the compound  the hybridization of C-2 and C-3 carbons are respectively– **sp^2 and sp**	**WB-JEE-2009**
In the compound, the number of sp-hybridised carbons are  – **4**	**WB-JEE-2015**

Aromatic Hydrocarbons

Benzene reacts with H_2 at 150°C at 30 atm pressure in the presence of Ni catalyst to give– **Cyclohexane**	**CG PET-22.05.2022**
In benzyne, the triple bond consists of– **one sp^2-sp^2 sigma bond, one sp^2-sp^2 pi bond and one p-p pi bond**	**VITEEE-2021**
The overlapping of orbitals in benzene is of the type– **$sp^2 - sp^2$**	**Karnataka-CET, 2008**
The reaction of choloroform with alcoholic KOH and p-toluidine forms–	**Assam CEE-2018**
Friedel-Crafts reaction, an aromatic aldehyde is treated with acetic anhydride in presence of corresponding salt of the acid to give an unsaturated aromatic acid this reaction is called as– **Perkin's reaction**	**[BITSAT-2007]**
In the given reaction sequence, the major product 'C' is:  – 	**JEE Main-24.06.2022, Shift-I**
The major product [Y] of the reaction  – 	**SCRA - 2009**
Number of hydrogen atoms in the given compound is  – **12**	**AP EAMCET (Engg.) 18.9.2020 Shift-I**

Search on TG: @apna_pdf

@apna_pdf

The product of the following reaction  – 	**AP EAPCET 20.08.2021 Shift-I**
The chlorine is passed through boiling toluene we get– **benzyl chloride**	**COMEDK 2017**
3-Phenylpropene on reaction with HBr gives (as a major product):– **$C_6H_5CH(Br)CH_2CH_3$**	**[AIIMS-2005]**
$C_6H_6 + CCl_4 \xrightarrow{AlCl_3} \mathbf{X} \xrightarrow{H_2O} \mathbf{Z}$ The product Z is– **$C_6H_5COC_6H_5$**	**SRMJEEE – 2014**
The reactions is the example of electrophilic substitution– **$C_6H_6 + CH_3Cl \xrightarrow{AlCl_3} C_6H_5CH_3 + HCl$**	**AMU-2004**
The major product of the reaction is:  – 	**[JEE Main-2019, 10 Jan Shift-I]**
Identify the compound X in the following reaction:  – 	**J & K CET-(2010)**
The reaction of  with HBr give predominantly– 	**Kerala-CEE-2008**
$Ph - CH_2 - CH = CH - CH_3 \xrightarrow[(ii)Alc.KOH]{(i)Br_2}$ – **$Ph - CH = CH - CH = CH_2$**	**AIIMS 25 May 2019 (Evening)**
The major product obtained from the following reaction is :  – 	**[JEE Main-2020, 6 Sep Shift-I]**
The hybridization involved in the six carbon atoms of benzene is:– **all six sp^2**	**AP EAMCET (Medical) - 1998**
The hybridization state of benzyl carbonium ion  – **sp^2**	**KARNATAKA NEET 2013**
Hybridization shown by carbon and oxygen of –OH group in Phenol are respectively .....– **sp^2, sp^3**	**GUJCET-2011**
During polymerization of acetylene to benzene, the state of hybridization of carbon changes from– **sp to sp^2**	**BCECE-2011**
The hybridization of the ipso carbon in chlorobenzene is– **sp^2 hybridisation**	**J & K CET-(2007)**

Search on TG: @apna_pdf

@apna_pdf

22. Environmental Chemistry

Environmental Pollution

- A substance, causes pollution, is known as– **Pollutants**
- The pollutants are easily degradable– **Discarded vegetables**
- Not a common component of photochemical smog– **Chlorofluorocarbons**
- The gases is not responsible for photochemical smog– **Inert gases**
- Freons are not recommended to be used in refrigerators because they– **Cause depletion of ozone layer**
- The region is greatly affected by air pollution is– **Troposphere**
- Ozone hole is maximum over– **Antarctica**
- The level of CO gas in air that causes immediate death is– **500 ppm**
- A greenhouse gas is. **O_2**
- The two strong acids present in the acid rain are– **H_2SO_4 and HNO_3**
- Not a 'green house gas', is– **O_2**
- UV radiations generally brings about– **Skin cancer**
- Photochemical smog is due to the presence of– **Oxides of nitrogen**
- The compounds helps in achieving equilibrium between O_2 and CO_2 in atmosphere– **Chlorophyll**
- The brown haze of photochemical smog is largely attributable to– **NO_2**
- Pollution is– **Release of toxic and undesirable materials in environment**
- Man dies in the atmosphere of CO because– **It combines with the haemoglobin of blood making it incapable of absorbing O_2**
- The pH of normal rain water is– **5.6**
- The most abundant hydrocarbon pollutant is– **Methane**
- The responsible for depletion of the ozone layer in the upper strata of the atmosphere– **Freons**
- The green house gas is/are– **CO_2**
- Used of chlorofluorocarbon is not encouraged because– **They eat away the ozone in the atmosphere**
- The highest concentration of PAN– **Photochemical smog**
- The processes is not responsible in adding particulates to the atmosphere– **Photosynthesis**
- An object is located at a height of 18 km from the surface of earth the object is located in– **Stratosphere**
- The free radicals is responsible for causing break down of ozone into oxygen due to use of CFCs– **$Cl^{\cdot}$**
- Carbon monoxide is harmful to human beings as it– **Has higher affinity for haemoglobin as compared to oxygen**
- Increased level of greenhouse gases cause global warming which will result in– **Melting of glaciers**
- The zone which extends above troposphere upto 50 km above sea level and contains dinitrogen, dioxygen, ozone and little water vapour is called– **Stratosphere**
- The smog is essentially caused by the presence of– **Oxides of sulphur and nitrogen**
- When rain is accompanied by a thunderstorm, the collected rain water will have a pH value– **slightly lower than that of rain water without thunderstorm**
- High concentration of the atmosphere leads to stiffness of flower buds eventually fall off from plants– **SO_2**
- The increased CO level in blood in the pregnant women who have the habit of smoking may induce– **Premature birth, Deformed babies and Spontaneous**
- An example of non-variable particulates– **Dust**

Water Pollution

- The conditions in drinking water causes methemoglobinemia is– **> 50 ppm of nitrate**
- Water filled in two glasses A and B have BOD values of 10 and 20, respectively. The correct statement regarding them, is– **B is more polluted than A**
- The maximum prescribed concentration of copper in drinking water is– **3 ppm**
- The recommended concentration of fluoride ion in drinking water is upto 1 ppm as fluoride ion is required to make teeth enamel harder by converting $[3Ca_3(PO_4)_2.Ca(OH)_2]$ to **$[3Ca_3(PO_4)_2.CaF_2]$**
- BOD values (in ppm) for clean water (A) and polluted water (B) are expected respectively as– **A < 5, B > 17**

TEAM SPM

Search on TG: @apna_pdf

@apna_pdf

- Fishes die in water bodies polluted by sewage due to– **Reduction in oxygen**
- BOD_5 represent– **Dissolved oxygen consumed in five days**
- Biochemical Oxygen Demand (BOD) is a measure of organic material present in water. BOD value less than 5 ppm indicates a water sample to be– **Rich in dissolved oxygen**
- Sewage containing organic waste should not be disposed in water bodies because it causes major water pollution. fishes in such a polluted water die because of– **Decrease in the amount of dissolved oxygen in water**
- Biochemical Oxygen Demand, (BOD) is a measure of organic material present in water. BOD value less than 5 ppm indicates a water sample to be– **Rich in dissolved oxygen**
- Not a property of DDT– **Fertilizer, Biodegradable pollutant and Green house gas**
- Four samples of water A, B, C and D have the DO values 1 mg/litre, 3mg/litre, 5 mg/litre and 8mg/litre respectively.
  The more polluted sample of water is– **A**
- Eutrophication casues– **Reduction in dissolved oxygen**
- The incorrect choice of ill-effects caused by the pollutant– **Sulphur dioxide-Nervous system diseases**
- Excess nitrate in drinking water can cause– **Methemoglobinemia**
- The process of "eutrophication" is due to:– **Increase in concentration of fluoride ion in water**
- A point source of water pollution– **Municipal and industrial discharge pipes**
- As DDT passes into food chain, its concentration– **Increases**
- Non-biodegradable wastes are generated by– **Thermal power plants**

Green Chemistry

- Sink for CO are – **Microorganisms present in the soil**
- Photochemical smog consists of excessive amount of X, in addition to aldehydes, ketones, peroxyacetyl nitrates (PAN) and so forth X is– **O_3**
- Green chemistry in day-to-day life is in the use of liquefied CO_2 for – **dry cleaning of clothes**
- Set of greenhouse gases is – **CO_2, CH_4, N_2O, O_3**
- The correct set of species responsible for the photochemical smog is– **NO, NO_2, O_3 and hydrocarbons**
- The pollution due to oxides of sulphur gets enhanced due to the presence of– **Ozone, Particulate matter, Hydrogen peroxide**
- Polar stratospheric clouds facilitate the formation of– **HOCl**
- The compound which causes both depletion of ozone layer and greenhouse effect is– **CFC**
- Ozone layer of stratosphere requires protection from indiscriminate use of– **Aerosols & high flying jets**
- Acid rains are produced by– **Excess NO_2 and SO_2 from burning fossil fuels**
- The gaseous envelope around the earth is known as atmosphere. The lowest layer of this is extended upto 10 km from sea level, this layer is– **Troposphere**
- Eutrophication of a lake means, it– **is high in nutrients**
- The statements about photochemical smog is wrong?– **It has low concentration of oxidising agent**
- The gaseous envelope around the earth is known as atmosphere. The lowest layer of this is extend upto 10 km from sea level, this layer is ____. **– Troposphere**
- Dinitrogen and dioxygen aer main constituents of air but these do not react with each other to form oxides of nitrogen because– **The reaction is endothermic and requires very high temperature**
- The pollutants come directly in the air from sources are called primary pollutants. Primary pollutants are sometimes converted into secondary polutants. Belongs to secondary air pollutants– **Peroxyacetyl nitrate**
- The one that is not a green house gas is– **Sulphur dioxide**
- The oxide of nitrogen is not a common pollutant introduced into the atmosphere both due to natural and human activity– **N_2O_5**
- The zone which extends above troposphere upto 50 km above sea level and contains dinitrogen, dioxygen, ozone and little water vapour is called– **Stratosphere**
- An object is located at a height of 18 km from the surface of earth. The object is located in– **Stratosphere**
- The region which is greatly affected by air pollution is– **Troposphere**
- Sulphur oxides which are responsible for major air pollution are caused by– **Burning of coal and refining of petroleum**
- Carbon monoxide is harmful to human beings as it has – **Higher affinity for haemoglobin as compared to oxygen**
- Incomplete combustion of petrol or diesel in automobile engine produces– **CO**
- Greenhouse gas is a– **CO_2**

Search on TG: @apna_pdf
@apna_pdf

- Increased level of greenhouse gases causes global warming which will result in– **Melting of glaciers**
- Acid rain is produced by excessive release of – **NO_2 and SO_2 in air**
- The two strong acids present in the acid rain are– **H_2SO_4 and HNO_3**
- The reactions that is taking place resulting in discolouration of marble of the buildings like Taj Mahal is–**$CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + H_2O + CO_2$**
- Mists are produced by– **Particles of spray liquids and by condensation of vapours in air**
- Classical smog is a common pollutant in places which have– **High concentration of SO_2 in air**
- The brown, hazy fumes of photochemical smog are due to– **Nitrogen dioxide**
- SO_2 and NO_2 cause pollution by increasing–**Acidity**
- Photochemical smog is formed due to presence of– **Oxides of nitrogen**
- The secondary precursors of photochemical smog are– **O_3 and PAN**
- The dissolution of ozone layer causes ozone hole in the blanket surrounding the atmosphere. The ill effects of ozone hole is–**UV rays reaching the earth**
- Free radicals responsible for causing break down of ozone into oxygen due to use of CFCs– **Cl**
- Ozone hole is maximum over– **Antarctica**
- In Antarctica, ozone depletion is due to the formation of the compounds– **Chlorine nitrate**
- Biological Oxygen Demand (BOD) can be defined as– **The amount of oxygen required by bacteria to break down the organic matter of a sample of water**
- Eutrophication causes– **Reduction in dissolved oxygen**
- As DDT passes into food chain, its concentration– **Increases**
- Biodegradable pollutants are– **Sewage**
- The gases is not a greenhouse gas– **CO**
- Photochemical smog occurs in warm, dry and sunny climate. One of the following is not amongst the components of photochemical smog, identify it–**SO_2**
- Green chemistry involves– **Use of non-toxic reagents and solvents to produce environment friendly products**
- The life a appearance of the historic monuments like Taj mahal are likely to be damaged by the presence of– **Excess of SO_2**
- Green chemistry means such ractions which– **Reduce the use and production of hazardous chemicals**

TEAM SPY

EXAM POINT

Environmental Pollution

The smog is essentially caused by the presence of– **Oxides of sulphur and nitrogen**	**JCECE - 2008 UPTU/UPSEE-2007, AIEEE 2004**
Eutrophication causes reduction in– **Dissolved oxygen**	**Karnataka-CET-2019 [BITSAT-2010]**
Air pollution that occurs in sunlight is:– **Oxidizing smog**	**AIIMS 25 May 2019 (Morning) JEE Main-10.04.2019, Shift-II**
Decomposition of ozone can be caused by– **atomic chlorine**	**SRMJEEE-2013, 2012**
The gas released during anaerobic degradation of vegetation may lead to– **global warming and cancer**	**[JEE Main-2021, 24 Feb Shift-I]**
Reducing smog is mixture of– **smoke, fog and SO_2**	**[JEE Main-2021, 17 march Shift-I]**
The condition that indicates a polluted environment is– **eutrophication**	**[JEE Main-2020, 5 Jan Shift-II]**
The molecule that has minimum/no role in the formation of photochemical smog, is– **N_2**	**[JEE Main-2019, 12 Jan Shift-I]**
The primary pollutant that leads to photochemical smog is– **nitrogen oxides**	**[JEE Main-2019, 12 April Shift-II]**
Carbon monoxide is a pollutant as it– **combines with haemoglobin**	**Assam CEE-2018**
SO_2 is considered as airpollutant because– **It reacts with O_2 and H_2O to produce acid rain**	**UPTU/UPSEE-2018**

Search on TG: @apna_pdf

@apna_pdf

The photochemical smog is– **formed due to oxidation of hydrocarbons trapped in stagnant air mass in the presence of sunlight**	**AMU-2017**
In environmental chemistry, the medium which is affected by a pollutant is called as the ..... .– **receptor**	**TS-EAMCET-2016**
Freon 12 is manufactured from CCl_4 by– **Swarts reaction**	**Kerala-CEE-2016**
The disease caused the high concentration of hydrocarbon pollutants in atmosphere is / are– **Cancer**	**[BITSAT-2015]**
Freon used as refrigerant is– **CCl_2F_2**	**JCECE-2012**
The gas emitted by supersonic jet planes that slowly depletes the concentration of ozone layer is– **NO**	**Kerala-CEE-2012**
CCl_4 and freons– **depletes ozone concentration**	**J & K CET-(2012)**
CO_2 goes to air, causes green house effect and gets dissolved in water. What will be the effect on soil fertility and pH of the water?– **Decreases**	**[BITSAT-2012]**
Producer gas is the mixture of– **$CO + N_2$**	**JCECE-2010**
Sewage mostly constitutes:– **Effluents**	**[BITSAT-2008]**
BOD is connected with:– **Microbes and organic matter**	**[BITSAT-2008]**
The type of pollution caused by spraying of DDT– **Air, water and soil**	**[BITSAT-2007]**
Bhopal gas tragedy of 1984 was caused by– **Methyl isocyanate**	**AP EAMCET-2007**
Poisonous gas present in the exhaust fumes of an automobile is– **CO**	**AP-EAMCET-1996**
The gas 'A' is having very low reactivity reaches to stratosphere. It is non-toxic and non-flammable but dissociated by UV-radiations in stratosphere. The intermediates formed initially from the gas 'A' are– **$\dot{C}l + \dot{C}F_2Cl$**	**[JEE Main-2021, 27 Aug Shift-I]**
BOD values (in ppm) for clean water (A) and polluted water (B) are expected respectively– **A < 5, B > 17**	**[JEE Main-2021, 31 Aug Shift-I]**
Identify the structure of the compound responsible for Bhopal disaster:– **$H_3C - N = C = O$**	**AP-EAPCET 23-08-2021 Shift-I**
The type of pollution that gets increased during the day time and in the presence of O_3 is:– **Oxidizing smog**	**JEE Main-16.03.2021, Shift-I**
The gas released during anaerobic degradation of vegetation may lead to :– **Global warming and cancer**	**JEE Main-24.02.2021, Shift-I**
The insecticide DDT is considered as .....– **non-biodegradable pollutant**	**AP EAMCET (Engg.) 17.09.2020 Shift-I**
Biochemical oxygen demand (BOD) is the amount of oxygen required (in ppm)– **by bacteria to breakdown organic waste in a certain volume of a water sample**	**[JEE Main-2020 Jan Shift-II]**
Peroxyacetyl nitrate (PAN), an eye irritant is produced by– **photochemical smog**	**[JEE Main-2019, 11 Jan Shift-I]**
Water samples with BOD values of 4 ppm and 18 ppm, respectively, are– **clean and highly polluted**	**[JEE Main-2019, 12 Jan Shift-I]**
DDT is– **2, 2-di(p-chlorophenyl)-1, 1, 1-trichloroethane**	**AMU-2016**
The gas leaked from a storage tank of the Union Carbide plant in Bhopal gas tragedy was– **Methylisocyanate**	**JEE Main-2013**
Freon, culprits in depletion of ozone layer are industrially produced from– **CH_2Cl_2**	**SCRA-2012**

Water Pollution

When rain is accompanied by a thunderstorm the collected rain water will have a pH value– **Slightly lower than that of rain water without thunderstorm**	**[BITSAT – 2014] AIEEE-2003**
The substance having the largest concentration in acid rain?– **H_2SO_4**	**WB-JEE-2018 [BITSAT-2007]**

Search on TG: @apna_pdf

@apna_pdf

The reagent used in the determination of the chemical oxygen demand (COD) of water sample is– **Acidified Potassium dichromate**	**TS-EAMCET (Engg.), 07.08.2021 Shift-II**
Thermal power plants can lead to– **acid rain**	**[JEE Main-2020 3 Sep Shift-I]**
Level of Biochemical oxygen demand indicates– **Water pollution**	**Assam CEE-2019**
The maximum prescribed concentration of copper in drinking water is– **3 ppm**	**[JEE Main-2019, 8 April Shift-II]**
The concentration of dissolved oxygen (DO) in cold water can go upto– **10 ppm**	**[JEE Main-2019, 11 Jan Shift-I]**
Taj Mahal is being slowly disfigured and discoloured. This is primarily due to– **acid rain**	**[JEE Main-2019, 11 Jan Shift-II]**
The process of 'eutrophication' is due to :– **the reduction in concentration of the dissolved oxygen in water due to phosphate pollution in water**	**Manipal-2016**
BOD is a measure of– **organic material present in water needing dissolved oxygen to break them down depleting oxygen content in water**	**COMEDK-2015**
Rain water is called acid rain when its pH– **falls below 5.6**	**COMEDK-2014**
Most abundant water pollutant is– **industrial wastes**	**BCECE-2011**
Minamata disease is due to pollution of– **industrial waster mercury into fishing water**	**[BITSAT-2010]**
Phosphate pollution is caused by:– **Sewage and agricultural fertilizers**	**[BITSAT-2010]**
The water pollutants mainly responsible for eutrophication are– **detergents and fertilizers containing phosphate anion**	**AMU-2005**
Water is considered to be polluted if the dissolved oxygen (DO) content is less than….ppm.– **10**	**AP EAMCET-2003**
Amongest $NO_3^-, AsO_3^{3-}, CO_3^{2-}, ClO_3^-, SO_3^{2-}$ and BO_3^{3-} the non-planar species are– **AsO_3^{3-}, ClO_3^-, and SO_3^{2-}**	**VITEEE, 2017**

Green Chemistry

In stratosphere most of the ozone formation is assisted by– **ultaviolet radiations**	**[JEE Main-2021, 27 Aug Sbift-II]**
Ozone in stratosphere is depleted by– **CF_2Cl_2**	**COMEDK-2019**
The regions of the atmosphere, where clouds form and where we live, respectively, are– **troposphere and troposphere**	**[JEE Main-2019, 10 April, Shift-I]**
The upper stratosphere consisting of the ozone layer protects us from the sun's radiation that falls in the wavelength region of– **200-315 nm**	**[JEE Main-2019, 12 Jan Shift-II]**
Excessive release of CO_2 into the atmosphere results in– **global warming**	**[JEE Main-2019, 9 April Shift-I]**
Ozone layer of stratosphere requires protection from indiscriminate use of– **aerosols and high flying jets**	**JCECE-2015**
Formation of ozone in the upper atmosphere from oxygen takes place by the action of– **Ultraviolet rays**	**[BITSAT-2012]**
The ozone layer forms naturally by– **The interaction UV radiation with oxygen**	**WB-JEE-2011**
The acid that is believed to be mainly responsible for the damage of Taj Mahal is:– **Sulfuric acid**	**JEE Main-29.06.2022, Shift-I**
The greenhouse effect is because of the– **presence of gases, which in general are strong inferred absorbers, in the atmosphere**	**[BITSAT-2020, 2013]**
Greenhouse gases show their activity by confining in the air-zone of– **troposphere**	**Tripura JEE-2019**
Green house effect is caused by– **CO_2**	**JCECE-2010**

TEAM SPM

Search on TG: @apna_pdf

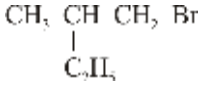
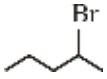
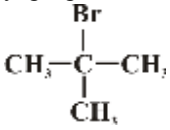
@apna_pdf

23. Haloalkanes and Haloarenes

Classification

- Primary halide is a– **Neo - hexylchloride**
- When two halogen atoms are attached to same carbon atom then it is– **Gem-dihalide**
- C_4H_9X is a– **Primary, sec and tertiary alkyl halide**

Nomenclature

- The IUPAC name of tertiary butyl chloride is– **2-chloro-2-methylpropane**
- The IUPAC name of $(CH_3)_2CH–CH_2–CH_2Br$ is– **1-bromo-3-methylbutane**
- The IUPAC name of the compound $CH_3 – CH = CH – CH_2 – Br$ is– **1-Bromobut-2-ene**
- The correct IUPAC name for diethylbromomethane should be– **3-Bromopentane**
- The correct IUPAC name for :  **1-Bromo-2-methylbutane**
- The IUPAC name of tertiary Butyl chloride is– **2 - Chloro - 2 - methyl propane**
- $CH_2 = CH – CH_2 – Cl$ the common name for the molecule is– **Allyl chloride**
- The structure of 2 - Bromopentane– 
- The structure of 2 - Bromo - 2 - methyl propane– 

Method of Preparation

- Chlorobenzene on treatment with sodium in dry ether gives diphenyl. The name of the reaction is– **Fitting reaction**
- Methyl bromide reacts with AgF to give methyl fluoride and silver bromide. This reaction is called– **Swarts reaction**
- In Finkelstein reaction when acetone is replaced by water then– **Reaction occurs backward because NaCl formed in right hand side is soluble in water and cannot ppt. out**
- $CH_3 – CH_2 – CH_2Cl \xrightarrow[\text{Dry acetone}]{\text{NaI}} CH_3CH_2CH_2I$ The reaction name is– **Finkelstein reaction**
- The reaction, $C_2H_5Br + NaI \xrightarrow[\Delta]{\text{Acetone}} C_2H_5I + NaBr$ is called– **Finkelstein reaction**
- $C_6H_5CH_3 \xrightarrow{Br_2 / FeBr_2}$, the reaction is called– **Electrophillic substitution**
- Chloropicrin is obtained by the reaction of– **Nitric acid on chloroform**
- When cis-but-2-ene is treated with Br_2 in CCl_4 medium the product formed will be– **Mixture of (2R, 3R) dibromobutane**
- $C_6H_5CH_2Br \xrightarrow[2.H_3O^+]{1.Mg, Ether} X$, the product 'X' is– **$C_6H_5CH_3$**
- The ..... reactions is an example of nucleophilic substitution reaction– **RX + KOH → ROH + KX**
- Monobromination of 2-methylbutane gives ..... distinct structural isomers– **Four**

Physical Properties

- ..... molecules has highest dipole moment– **CH_3Cl**
- ..... the compounds has the highest boiling point– **$CH_3CH_2CH_2CH_2Cl$**
- The compounds will have highest melting point– **p-Dichlorobenzene**
- Alkyl halides are immiscible in water though they are polar because– **They cannot form hydrogen bonds with water**
- The main difference in C–X bond of a haloalkane and a haloarene is– **In haloalkanes the C attached to halogen in C–X bond is sp^3 hybridised while in haloarenes it is sp^2 hybridised**
- The molecules has highest dipole moment– **CH_3Cl**
- Decreasing order of reactivity of hydrogen halide acid in the conversion of ROH → RX is– **HI > HBr > HCl > HF**
- The density of glycerol is higher than propanol due to– **Hydrogen bonding**
- The correct order of boiling point for isomeric primary (1^0), secondary (2^0) and tertiary (3^0) alcohols is– **$1^0 > 2^0 > 3^0$**

Search on TG: @apna_pdf

@apna_pdf

Chemical reaction

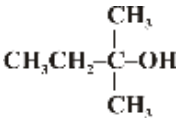
- Tertiary butyl bromide on reaction with sodium methoxide mainly gives– **2-methylpropene**
- Chloroform is kept in dark coloured bottles because– **It is oxidised to poisonous gas, phosgene in sunlight**
- Triiodomethane has antiseptic property because of– **Liberation of free iodine**
- The fire extinguisher 'pyrene' contains– **Carbon tetrachloride**
- An organic halogen compound which is used as refrigerant in refrigerators and air conditioners is– **Freon**
- Toluene reacts with a halogen in the presence of iron (III) chloride giving ortho and para halo compounds. The reaction is– **Electrophilic substitution reaction**
- Example of vic-dihalide is a– **1,2-Dichloroethane**
- The position of –Br in the compound $CH_3CH=CHC(Br)(CH_3)_2$ can be classified as– **allyl**
- Chlorobenzene is formed by reaction of chlorine with benzene in the presence of $AlCl_3$. The species that is attacks the benzene ring in this reaction– Cl^+
- Ethylidene chloride is a– **gem-dihalide**
- The alkyl halides will undergo S_N1 reaction most readily– $(CH_3)_3C–I$
- Reaction of $C_6H_5CH_2Br$ with aqueous sodium hydroxide follows– **S_N1 mechanism**
- The synthesize chlorobenzene is suitable to– **Benzene, Cl_2, anhydrous $AlCl_3$**
- The major product formed in dehydrohalogenation reaction of 2-bromopentane is pent-2-ene. This product formation is based on– **Saytzeff's Rule**
- Cyanide ion acts as an ambident nucleophile. From end it acts as a stronger nucleophile in aqueous medium– **It acts as a stronger nucleophile from carbon end**
- Butane nitrile can be prepared by heating– **Propyl chloride with KCN**
- Ethyl alcohol is obtained when ethyl chloride is boiled with– **Aqueous KOH**
- The alkyl halides undergoes hydrolysis with aqueous KOH at the fastest rate– **$CH_3CH_2CH(Br)CH_3$**
- The alkyl halide is converted into an alcohol by– **Substitution**
- An alkyl halide, RX reacts with KCN to give propane nitrile. RX is– **C_2H_5Br**
- In S_N2 reactions the sequence of bond breaking and bond formation is as follows– **Bond breaking and formation occur simultaneously**
- Tertiary alkyl halides are practically inert to substitution by S_N2 mechanism because– **There is steric hindrance**
- The alkyl bromide, the least reactive bromide in S_N2 reaction is– **2-bromo-2-methylbutane**
- The haloalkanes is most reactive in– **2-Bromopropane**
- The most reactive towards nucleophilic substitution reaction is– **$ClCH_2 – CH = CH_2$**
- The alkyl halides is hydrolysed by S_Nl mechanism is– **$(CH_3)_3CCl$**
- The most reactive towards aqueous NaOH is– **$C_6H_5CH_2Cl$**
- The haloalkanes reacts with aqueous KOH most easily is– **2-Bromo-2-methylpropane**
- The alkyl halide exhibits complete recemisation in S_N1 reaction is– **$C_6H_5CH_2Cl$**
- The order of reactivity of various alkyl halides towards nucleophilic substitution, the order– **R –I > R – Br > R – Cl > R – F**
- 2-Bromo-3, 3-dimethylbutane on reaction with aqueous KOH yields X as the major product. X is– **2, 3-dimethylbutan-2-ol**
- A mixture of 1-chloropropane and 2-chloropropane when treated with alcoholic KOH gives– **Prop-1-ene**
- 2-Chloro-2-methylpropane on reaction with alc. KOH gives X as the product. X is– **2-methylprop-1-ene**
- Reaction of trans-2-phenyl-1-bromocyclopentane on reaction with alcoholic KOH produces– **3-phenylcyclopentene**
- The ease of dehydrohalogenation of alkyl halide with alcoholic KOH is– **$3^0 > 2^0 > 1^0$**
- Elimination of bromine from 2-bromobutane results in the formation of– **Predominantly 2-butene**
- Grignard reagent, a very useful starting compound for a number of organic reactions can be prepared by– **Reaction of alkyl halides with dry magnesium powder in presence of dry ether**
- The order of reactivities of methyl halides in the formation of Grignard reagent is– **$CH_3I > CH_3Br > CH_3Cl$**
- Alkyl halides react with metallic sodium in dry ether producing– **Alkanes with double the number of carbon atoms**
- The compounds can yield only one monochlorinated product upon free radical chlorination– **2, 2-Dimethylpropane**
- Bromination of methane in presence of sunlight is a– **Free radical substitution**
- The negative part of the addendum (the molecule to be added) adds on to the carbon atom of the double bond containing the least number of hydrogen atoms. This rule is known as– **Markovnikov's rule**
- The reactions follows Markovnikov's rule– **$C_3H_6 + HBr$**
- The addition of HBr is easiest with– **$(CH_3)_2C = CH_2$**

TEAM SDV

Search on TG: @apna_pdf

@apna_pdf

- ..... is most reactive nucleophile in polar protic solvent– **I^-**
- ..... solvent is suitable for S_N1 reaction– **Polar protic**
- ..... is known as freon 12– **CCl_2F_2**
- ..... is gem-dihalide– **CH_3CHBr_2**
- Two possible stereo-structure of $CH_3CHOH.COOH$ ..... are optically active– **Enantiomers**
- In an S_N1 reaction on chiral centers, there is– **Inversion more than retention leading to partials recemization**
- ..... most reactive towards S_S1 reaction– **$C_6H_5C(CH_3)(C_6H_6)Br$**
- If there is no rotation of plane polarized light by a compound in a specific solvent, thought to be chiral, it may mean that– **The compound is certainly meso**
- Reactivity order of halide for dehydrohalogenation is– **R – I > R – Br > R – Cl > R – F**
- ..... is least reactive in a nucleophilic substitution reaction– $CH_2 = CHCl$
- The correct sequence of bond enthalpy of 'C–X' bond is– **$CH_3 – F > CH_3 – Cl > CH_3 – Br > CH_3 – I$**
- The major product formed in dehydrohalogenation reaction of 2-Bromo pentane is Pent-2-ene. This product formation is based on– **Saytzeff's rule**
- Elimination reaction of 2-Bromo-pentane to form pent-2-ene is– **β-Elimination reaction, Follows Zaitsev rule, Dehydrohalogenation reaction**
- The ..... is a secondary alkyl halide– **Isoproply chloride**
- The alcohols will yield the corresponding alkyl chloride on reaction with concentrated HCl at room temperature–



- Toluene reacts with a halogen in the presence of iron (III) chloride giving ortho and para halo compounds. The reaction is– **Electrophilic substitution reaction**
- Halogen exchange reaction– **RX + NaI → RI + NaX**
- Example of vic-dihalide is– **1, 2-dichloroethane**
- The position of Br in the compound in $CH_3CH = CHC(Br)(CH_3)_2$ can be classified as– **Allyl**
- Chlorobenzene is formed by reaction of chlorine with benzene in the presence of $AlCl_3$. The species that attacks the benzene ring in this reaction– **Cl^+**
- Ethylidene chloride is a– **Gem-dihalide**
- A primary alkyl halide would prefer to undergo– **S_N2 reaction**
- The alkyl halides that will undergo S_N1 reaction most readily– **$(CH_3)_3C–I$**
- Increasing the concentration of a nucleophile in a typical S_N2 reaction by a factor of 10 will cause the reaction rate to– **Increase by a factor of 10**
- Treatment of 1-phenyl-2-chloropropane with alcoholic KOH gives mainly– **1-phenylpropene**
- S_N1 reaction is a– **$(CH_3)_3CBr + H_2O \rightarrow$**
- The species is an ambident nucleophile– **Cyanide ion**
- $C_2H_3Cl \xrightarrow[Ag_2O]{Moist} A \xrightarrow[360^0c]{Al_2O_3} B \xrightarrow{SOCl_2} C$

  In the above sequence of reactions, C is– **Mustard gas**
- The purity of $CHCl_3$ can be checked by treating with– **$AgNO_3$**
- S_N1 reaction is most feasible in–
- In the given reaction, $CH_3–CH_2X + CH_3SNa \rightarrow$ The fastest reaction occurs when 'X' is– **$–OCOCF_3$**
- 3-methylpent-2-ene on reaction with HBr in the presence of peroxide forms an addition product. The number of possible stereoisomers for the product is– **Four**
- The alkyl halide that undergoes S_N1 reaction more readily– **t-butyl bromide**
- The chemical formula of tear gas is– **$CCl_3 . NO_2$**
- The halogen exchange reaction will occur in acetone– **$R – Cl + NaI \longrightarrow$**
- 2-Bromopentane is heated with EtO^-Na^+ in ethanol. The major product obtained is– **Pent-2-ene**
- Replacement of Cl of chlorobenzene to give phenol requires drastic conditions. But chlorine of 2, 4-dinitrochlorobenzene is readily replaced– **NO_2 withdraws electron from ortho/para position**
- Ethylidene chloride reacts with aq. KOH to form ..... compound– **Acetaldehyde**
- 2-Bromopentane is heated with potassium ethoxide in ethanol. The major product obtained is– **Trans-2-pentene**
- In the reaction $ROH \xrightarrow{Red\ P+I_2} RI + A$; A is– **$H_3PO_3$**
- 1-Butene when treated with HBr gives– **sec. - Butyl bromide**
- $CH_3 – C \equiv CH \xrightarrow{Na} \xrightarrow{CH_3–CH_2–I}$ Product

  The Final product of the given reaction – **$CH_3 – C \equiv C – CH_2 – CH_3$**
- Markovnikov's rule reaction is– **$C_3H_6 + HBr$**
- $CH_3CH_2CH_2OH \xrightarrow{PCl_5} \xrightarrow{abc.KOH} B$

  B is in the scheme– **Propene**

Search on TG: @apna_pdf

@apna_pdf

- The compounds that can yield only one monochorinated product upon free radical chlorination– **2, 2–Dimethyl propane**
- $1-\text{Chloropropane} \xrightarrow{\text{ale.KOH}} B \xrightarrow{HX} C$. In this reaction C is– **sec. Alkyl halide**
- The reaction of toluene with chlorine in the presence of $FeCl_3$ gives predominantly– **A mixture of o - and p - Chlorotoluene**
- A primary alkyl halide would prefer to undergo– **S_N2 reaction**
- The halogen atom attached to C - atom in the benzene ring is– **o, p - directing and deactivating**
- A S_N2 reaction takes place with– **Inversion of configuration**
- The alkyl halide is converted into an alcohol by– **Substitution**
- Grignard reagents are formed by the reaction of alkyl halides by warming with– **Mg in presence of dry ether**
- The alkyl halides that is hydrolysed by S_Nl mechanism– **$(CH_3)_3C\ Cl$**
- Among the choices of alkyl bromide, the least reactive bromide in S_N2 reaction is– **2 - Bromo - 2 - methyl butane**
- 2 - Chloro - 2 - methyl propane on reaction with alcoholic KOH gives X as the product, X is– **2 - Methyl prop - 1 - ene**
- The haloalkanes that reacts with aqueous KOH most easily (via S_Nl) is **2-Bromo-2-methylpropane**
- The haloalkane that is most reactive towards S_Nl– **2-Bromopropane**
- Reaction of ethyl halide with alkoxide is called– **Williamson's synthesis**
- In the reaction

  $CH_3-CH_2-CH=CH_2 \xrightarrow{HX} B \xrightarrow[Ag_2O]{\text{moist}} C$; C is– **Secondary alcohol**
- Alc. KOH is used for– **Dehydrohalogenation**
- In the reaction,

  $C_2H_5l \xrightarrow{\text{alc.KOH}} X \xrightarrow{Br_2} Y \xrightarrow{KCN} Z$; X, Y and Z are respectively– **$C_2H_4, CH_2BrCH_2Br, CNCH_2CH_2CN$**
- Bromobutane on treatment with alc.KOH gives– **But - 1 - ene, But - 2 - ene**
- In the reaction,

  $CH_3Br \xrightarrow{KCN} (A) \xrightarrow{H_3O^+} B \xrightarrow[\text{ether}]{LiAlH_4} C$.C is – **Ethyl alcohol**
- $CH_3CH_2CH_2Br \xrightarrow[\text{alcohol}]{KOH} CH_3CH=CH_2$

  The reaction is an example of– **Elimination**
- Iso - propyl bromide on Wurtz reaction gives– **2, 3 - dimethyl butane**
- An organic halogen compound that is used as refrigerant in refrigerators and air conditioners is– **Freon**
- Gammexane is chemically known as– **Benzene hexachloride**
- Freon used as refrigerant is– **CCl_2F_2**
- The highest chlorine content is– **Pyrene**

Polyhalogen compound

- An organic compound $A(C_4H_9Cl)$ on reaction with Na/diethyl ether gives a hydrocarbon which on monochlorination gives only one chloro derivative then, A is– **t-butyl chloride**
- ..... is used as fire extinguisher under the name pyrene– **CCl_4**
- ..... is used as a refrigerant– **CF_2Cl_2**
- $(P-ClC_6H_4)_2CHCCl_3$ is used as– **Insecticide**
- CHI_3 is used as– **Antiseptic for wounds**
- Primary halide is a– **neo-Hexyl chloride**
- Haloalkanes contain halogen atom(s) attached to the sp^3 hybridised carbon atom of an alkyl group. Haloalkane from the compounds is– **2-Bromopentane, Trichloromethane**

EXAM POINT

Nomenclature

Gammexane is the name of– **benzene hexachloride**	**COMEDK 2019**
An alkyl bromide (X) reacts with sodium in ether to form 4, 5-diethyl octane, the compounds X is– **$CH_3-(CH_2)_2-CH(Br)-CH_2-CH_3$**	**Karnataka CET-2013**

JEAMSPY

Search on TG: @apna_pdf

@apna_pdf

Method of Prepration

Finkelstein reaction is used for the synthesis of– **RI**	**AP EAMCET-04.07.2022, Shift-II**
Ammonolysis of alkyl halides followed by the treatment with NaOH solution can be used to prepare primary, secondary and tertiary amines. The purpose of NaOH in the reaction is– **to remove acidic impurities**	**JEE Main 2021, 16 March Shift-II**
The suitable reagents for the conversion of methane into methyl iodide are_____ **I_2 , HNO_3**	**AP EAPCET 23-08-2021 Shift-I**
1, 2 – Dichloro ethane is a– **Vicinal halide**	**GUJCET-2019**
The synthesis of alkyl fluorides is best accomplished by – **Swarts reaction**	**AIIMS-2017**
$C_2H_2 + 2HCl \rightarrow C_2H_4Cl_2$ is an example of– **addition reaction**	**AP EAMCET (Engg.)-2005**
The chlorination of ethane is an example for mechanism reactions involving– **Free radical substitution**	**AP EAMCET (Engg.) - 2012**
Propene was oxidised by aqueous $KMnO_4$ to give compound (A). Treatment of compound (A) with thionyl chloride gave– **1, 2-dichloropropane**	**AMU-2014**
In the presence of Lewis acid toluene reacts with chlorine to give– **o/p-chlorotoluene**	**AIEEE-2007**
The catalyst used in the preparation of an alkyl chloride by the action of dry HCl on an alcohol is– **anhydrous $ZnCl_2$**	**JCECE - 2009**
Hydrolysis of benzonitrile by dilute HCl yields– **benzoic acid**	**JCECE - 2011**
$C_6H_6 + Cl_2$ (excess) $\xrightarrow[\text{dark, cold}]{\text{Anhy.AlCl}_3}$ P Product, P is– **C_6Cl_6**	**JCECE - 2013**
C — Cl bond in chlorobenzene in comparison to C — Cl bond in methyl chloride is– **shorter and stronger**	**AP EAMCET (Engg.) 17.09.2020, Shift-II**
Arylbromides are not good candidates for– **Gabriel-phthalimide synthesis**	**Kerala CEE-2019**
A compound that undergoes bromination easily is– **phenol**	**COMEDK 2018**
The major product obtained when chlorobenzene is nitrated with HNO_3 + conc. H_2SO_4 is– **1-chloro-4-nitrobenzene**	**COMEDK 2014**
The best method to separate the mixture of ortho and para nitrophenol (1:1) is– **distillation**	**UP CPMT-2008**
Chlorobenzene gives aniline with – **NH_3/Cu_2O**	**UPTU/UPSEE-2005**

Physical Properties

On the surface of polar stratospheric clouds, hydrolysis of chlorine nitrate gives A and B while its reaction with HCl produces B and C. A, B and C are, respectively– **HOCl, HNO_3, Cl_2**	**JEE Main-27.06.2022, Shift-II**
During halogen test, sodium fusion extract is boiled with concentrated HNO_3 to– **decompose cyanide or sulphide of sodium**	**JEE Main-25.06.2022, Shift-II**
The most suitable solvent for Wurtz reaction is– **Dry ether**	**TS EAMCET-18.07.2022, Shift-II**
The decreasing order of boiling points of alkyl halides is– **RI > RBr > RCl > RF**	**MHT CET-03.05.2019, SHIFT-I** **Kerala CEE-2012** **AMU-2012**

Search on TG: @apna_pdf

@apna_pdf

The correct sequence of bond enthalpy of 'C–X' bond is– **$CH_3–F>CH_3–Cl>CH_3–Br>CH_3–I$**	**NEET 2021**
The boiling point of alkyl halide are higher than those of corresponding alkanes because of– **dipole-dipole interaction**	**BITSAT-2021**

Chemical reaction

In Friedel-Crafts alkylation of aniline, one gets– **Positively charged nitrogen at benzene ring.**	**JEE Main-29.06.2022, Shift-II**
For a given alkyl group, the reactivity order of halides in S_N1 reaction is– **R – I > R – Br > R – Cl > R – F**	**JCECE-2019, AIPMT - 2002**
Action of hydrogen iodide on anisole gives– **phenol and iodomethane**	**MHT CET-02.05.2019, SHIFT-III**
Product obtained by heating C_2H_5Br in presence of dry silver oxide is– **$C_2H_5OC_2H_5$**	**Assam CEE-2018**
Alkyl halides react with dialkyl copper reagents to give– **alkanes**	**JCECE - 2017 JCECE -2008 UPTU/UPSEE -2007**
Toluene reacts with halogen in presence of iron (III) choride giving ortho and para halo compounds. The reaction is– **electrophilic substitution reaction**	**Karnataka CET-2017**
Wurtz reaction involves the reduction of alkyl halide with– **Na in ether**	**Manipal-2017**
The carbocation formed in S_N1 reaction of alkyl halide in the slow step is– **sp^2-hybridised**	**AMU-2016**
The synthesis of alkyl fluorides is best accomplished by– **Swarts reaction**	**JEE Main-2015**
Phosgene can be obtained when– **chloroform reacts with air**	**JCECE - 2015**
$C_2H_5Cl \xrightarrow[Ag_2O]{Moist} A \xrightarrow[360°C]{Al_2O_3} B \xrightarrow{S_2Cl_2} C$ In the above sequence of reactions, compound C is– **mustard gas**	**AP EAMCET (Medical) - 2007**
Iodobenzene can be prepared by treating– **benzene diazonium chloride with KI**	**SCRA - 2009**
For S_N1 reaction, the order of reactivity of haloalkanes is– **tertiary halide > secondary halide > primary halide**	**COMEDK 2014**
The organic chloro compound, which shows complete stereochemical inversion during an S_N2 reaction is – **CH_3Cl**	**AIEEE 2008**
Conversion of chlorobenzene to phenol involves– **nucleophilic substitution**	**J & K CET-2008**
Reaction of methyl bromide with aqueous sodium hydroxide involves– **S_N2 mechanism**	**Karnataka CET, 2010**
Ethylidene dibromide $\xrightarrow{A}$ CH ≡ CH . Here A is– **alc. KOH**	**UP CPMT-2009**
Ethyl bromide is industrially prepared from– **ethyl alcohol+HBr**	**UP CPMT-2007**
The ease of dehydrohalogenation of alkyl halide with alcoholic KOH is– **3° > 2° > 1°**	**WB-JEE-2011**

Polyhalogen Compounds

Neopentyl bromide, undergoes dehydrohalogenation to give alkenes even though it has no hydrogen. This is due to– **Rearrangement of carbocations by E1 mechanism**	**Kerala CEE-2018**
Chloropicrin is obtained by the reaction of– **nitric acid on chloroform**	**AIIMS-2010**

TEAM SPY

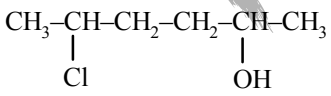
Search on TG: @apna_pdf
@apna_pdf

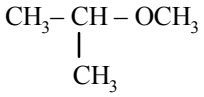
24. Alcohols Phenols and Ethers

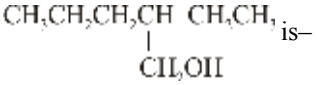
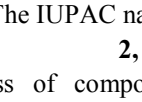
Classification

- A compound $C_6H_{14}O_2$ has two tertiary alcoholic groups. The IUPAC name of this compound is– **2, 3-dimethyl - 2, 3-butanediol**
- The class of compound that is obtained upon substitution of hydrogen by alkoxy/aryloxy group in hydrocarbon– **Ether**
- ..... is used for polishing wooden furniture– **Ethanol**
- Butan - 2 - ol is a– **Secondary alcohol**
- Example of allylic alcohol is– **CH_2=CH–CH_2–OH**
- o - cresol is a– **Monohydric**
- The formula C_3H_8O represents– **Both ether and alcohols**
- Simple ether is a– **CH_3OCH_3**
- Phenols can be distinguished from alcohols by– **$FeCl_3$ (neutral)**
- The general molecular formula, which represents the m homologous series of alkanols is– **$C_nH_{2n+2}O$**
- Total number of alcohols with molecular formula $C_4H_{10}O$ are chiral in nature– **1**

Nomenclature

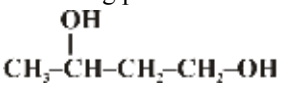
- IUPAC name of m-cresol is– **3-methylphenol**
- 

  IUPAC name of the compound is– **5-chlorohexan-2-ol**
- IUPAC name of m-cresol is– **3-methylphenol**
- 

  IUPAC name of the compound is– **2-methoxypropane**
- IUPAC name of $HOCH_2CH_2OH$ is– **Ethane 1,2-diol**
- ..... show tautomerism– **Phenol**
- Alcohols and ethers are– **Functional isomers**
- ..... minimum number of carbon are needed for an optically active ether– **3**
- The IUPAC name of  is– **2 - ethylpentan - 1- ol**
- 

  The correct common name of the compound is– **Glycerol**

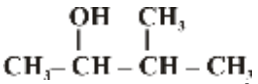
Structures of functional groups

- Boiling point of ethyl alcohol is greater than ether due to– **Hydrogen bonding**
- Monochlorination of toluene in sunlight followed by hydrolysis with aq. NaOH yields– **Benzyl alcohol**
- CH_3CH_2OH can be converted into CH_3CHO by – **Treatment with pyridinium chlorochromate**
- The process of converting alkyl halides into alcohols involves– **Substitution reaction**
- Phenol is– **Cresol, Catechol, Benzenol**
- The C–O–C angle in ether is about– **110^0**
- The C–O–H bond angle in alcohols is slightly less than the tetrahedral angle whereas the C–O–C bond angle in ether is slightly greater because– **Of repulsion between the two bulky R groups**
- In allylic and benzylic alcohols, –OH group is attached to– **sp^3, sp^3 - hybridised carbon atom respectively**
- A polyhydric alcohol is a– **$C_3H_8O_3$**
- Grignard reagent is suitable reagent for the preparation of ..... from carbonyl compound– **1° alcohols, 2° alcohols, 3° alcohols**
- The most acidic is– **p-nitrophenol**
- Increasing order of acid strength among p-methoxy phenol, p-methyl phenol and p-nitrophenol is– **p-methoxyphenol, p-methylphenol, p-nitrophenol**
- The reagents that would distinguish ciscyclopenta-1, 2-diol from the trans-isomer– **Acetone**
- The molecule with maximum boiling point is– 

Search on TG: @apna_pdf

@apna_pdf

- The structure of 3 - Methylbutan - 2 - ol is–



- The C – O – C angle in ether is about– **110^0**
- In the reaction

$$CH_3 - CH - CH_2 \xrightarrow{H_2SO_4} B \xrightarrow{H_2O} C$$

B and C are respectively–
iso - proply hydrogen sulphate and propan-2-ol

- In the reaction, acetone

$\xrightarrow{Red^n} B \xrightarrow{dil.H_2SO_4} C$, C is– **Propene**

- Lucas reagent is– **Conc. HCl & anhydrous $ZnCl_2$**
- The reagent converts propene to l-propanol is–
B_2H_6,H_2O_2,OH

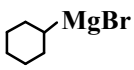
Alcohols and phenols

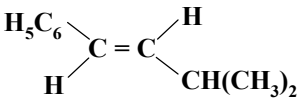
- n - Propyl alcohol and iso-propyl alcohol can be chemically distinguished by which reagent–
$K_2Cr_2O_7/H_2SO_4$
- Tertiary butyl alcohol gives tertiary butyl chloride on treatment with– **conc. HCl/anhydrous $ZnCl_2$**
- R – OH + HX → RX + H_2O. In the above reaction, the reactivity of alcohols is–
Tertiary > secondary > primary
- The alcohols will give the most stable carbocation during dehydration is– **2-Methyl-2-propanol**
- $(CH_3)_3$ C–$CH_2OH \xrightarrow[170^0 C]{Conc.H_2SO_4} X$ In the reaction, X is– **$(CH_3)_2$ C = $CHCH_3$**
- Acid catalysed dehydration of t-butanol is faster than that of n-butanol because–
Tertiary carbocation is more stable than primary carbocation
- The major product of acid catalysed dehydration of 2-methylcyclohexanol and butain-1-ol are respectively– **1-methylcyclohexene and but-1-ene**
- An alcohol X on heating with concentrated H_2SO_4 gives an alkene Y which can show geometrical isomerism. The alcohol X is–
$CH_3CH_2CH(OH)CH_3$
- A compound X with the molecular formula, C_3H_8O can be oxidized to another compound Y whose molecular formula is $C_3H_6O_2$. The compound X may be– **$CH_3CH_2CH_2OH$**
- The best reagent to convert pent-3-en-2-ol into pent-3-en-2-one is– **Pyridinium chlorochromate**
- The most suitable reagent for the conversion of RCH_2OH → RCHO is– **PCC**
- Conversion of ethyl alcohol into acetaldehyde is an example of– **Oxidation**
- Vapours of an alcohol X when passed over hot reduced copper, produce an alkene, the alcohol is–
Tertiary alcohol
- When tertiary butyl alcohol is passed over heated copper at 300^0C, It happens–
2-Methylpropene is formed
- Conversion of phenol to salicylic acid and to salicylaldehyde is known as (respectively)–
Kolbe's reaction and Reimer-Tiemann reaction
- Picric acid is a yellow coloured compound. Its chemical name is– **2, 4, 6-trinitrophenol**
- Phenol when treated with excess of bromine water gives a white precipitate of–**2, 4, 6-tribromophenol**
- The major product obtained on interaction of phenol with sodium hydroxide and carbon dioxide is–
Salicylic acid
- Out of benzene and phenol, phenol is more easily nitrated because– **Presence of –OH group in phenol increases the electron density at ortho and para-position**
- Benzoquinone is prepared by reaction of phenol with– **$Na_2Cr_2O_7$, H_2SO_4**
- Methyl alcohol is industrially prepared by the action of– **CO + H_2**
- The enzyme which can catalyse the conversion of glucose to ethanol is– **Zymase**
- The alcohols that gives the best yield of dialkyl ether on being heated with a trace of sulphuric acid–
1-Pentanol
- The best method to prepare 3-methylbutan-2-ol from 3-methylbut-1-ene is–
Addition of water in presence of dil. H_2SO_4
- An alkene $CH_3CH{=}CH_2$ is treated with B_2H_6 in presence of H_2O_2. The final product formed is–
$CH_3CH_2CH_2OH$
- One mole of ethyl acetate on treatment with an excess of $LiAlH_4$ in dry ether and subsequent acidification produces– **2 moles of ethyl alcohol**
- Tertiary butyl alcohol can be prepared by the reaction of–**Acetone and methyl magnesium iodide**
- l-Phenylethanol can be prepared by the reaction of benzaldehyde with– **Methyl iodide & magnesium**
- The reactant and reagent and reagent used to obtain 2, 4-dimethylpentan-3-ol would be–
2-Methylpropanal and isopropyl magnesium iodide
- Propanone on reaction with alkyl magnesium bromide followed by hydrolysis will produce–
Tertiary alcohol
- Cumene on reaction with oxygen followed by hydrolysis gives– **C_6H_5OH and CH_3COCH_3**
- Phenol is heated with a solution of mixture KBr and $KBrO_3$. The major product obtained in the above reaction is– **2, 4, 6-tribromophenol**
- ortho-Nitrophenol is less soluble in water than p- and m-nitrophenols because– **o-nitrophenol shows intramolecular H-bonding**

JEAMSOY

Search on TG: @apna_pdf
@apna_pdf

- Unlike phenol, 2, 4-dinitrophenol is soluble in aqueous solution of sodium carbonate because– **Presence of two–NO_2 groups in the ring makes 2, 4-dinitrophenol a stronger acid than phenol**
- For the reaction, $C_2H_5OH + HX \rightarrow C_2H_5X + H_2O$; the order of reactivity is– **HI > HBr > HCl**
- Out of 2-chloroethanol and ethanol is more acidic and why– **2-Chloroethanol due to – I effect of Cl**
- p-Nitrophenol is a stronger acid than phenol while p-cresol is a weaker acid. This can be explained as– **– NO_2 group decreases electron density on oxygen of O – H group making p-nitrophenol a stronger acid**
- Ethylene oxide when treated with Grignard reagent yields– **Primary alcohol**
- ..... reagent converts propene to 1-propanol– **$Hg(OX)_2$, $NaBH_4/H_2O$**
- 3° alkyl halide form alcohols preferably via– **S_N1**
- $ROH + SOCl_2 \longrightarrow$ The final product is– **Alkyl chloride**
- 1° alcohols preferably undergo dehydration in presence of Al_2O_3 by– **E_2**
- ..... is inter-molecular dehyration– **$ROH \longrightarrow R - OR$**
- Reaction of t-butyl bromide with sodium methoxide produces– **Isobutylene**
- The heating of phenyl-methyl ethers with HI produces– **Phenol**
- Reaction of phenol with chloroform in presence of dilute sodium hydroxide finally introduces ..... functional group– **–CHO**
- When glycerol is treated with excess of HI, it produces– **2-iodopropane**
- When 3, 3-dimethyl 2-butanol is heated with H_2SO_4, the major product obtained is– **2, 3-dimethyl 2-butane**
- When phenol is treated with $CHCl_3$ and NaOH, the product formed is– **Salicylaldehyde**
- Electrophile in Reimer-Tiemann reaction– **: CCl_2**
- In Reimer Tiemann reaction, the major product is– **Ortho isomer due to intra molecular H-bonding**
- Lucas test is used to distinguish– **Alcohols**
- In Lucas test immediate turbidity is caused by– **3° alcohols**
- ..... reagent would distinguish cis-cyclopenta-1, 2-diol from the trans-isomer– **Acetone**
- n-propyl alcohol and isopropyl alcohol can be chemically distinguish by ..... reagent– **Oxidation with potassium dichromate**
- On heating glycerol with conc. H_2SO_4, a compound is obtained ..... has bad odour– **Acrolein**
- The compounds that will react with sodium hydroxide solution in water– **C_6H_5OH**
- Phenol is less acidic than– **o-nitrophenol**
- Most acidic is– **m-chlorophenol**
- Reaction between acetone and methylmagnesium chloride by hydrolysis will give– **Tert, butyl alcohol**
- The compound A on treatment with Na gives B, and with PCl_5 gives C. B and C react together to give diethyl ether. A, B and C are in the order– **C_2H_5OH, C_2H_5ONa, C_2H_5Cl**
- Lowest boiling point is for– **2-methyl propene-2-ol**
- Mono-chlorination of toluene in sunlight followed by hydrolysis with aq. NaOH yields– **Benzyl alcohol**
- $R - OH + HCl \xrightarrow{ZnCl_2} R - Cl + H_2O$

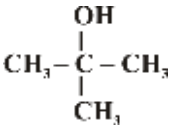
  The correct order of reactivity of alcohols in above reaction– **$3^0 > 2^0 > 1^0$**
- CH_3CH_2OH can be converted into CH_3CHO by– **Treatment with pyridinium chlorochromate**
- The process of converting alkyl halides into alcohols involves– **Substitution reaction**
- The compound is prepared from two substrate A & B, these are– **A = CH_2O** **B =** 
- Chlorination of toluene in the presence of light and heat followed by treatment with aqueous KOH gives– **Benzyl alcohol**
- Phenol is also called– **Carbolic acid**
- The main product of the reaction $C_6H_5CH_2CH(OH)CH(CH_3)_2 \xrightarrow{Conc.H_2SO_4}$ is

  
- Iso-propyl alcohol $\xrightarrow[\Delta]{Al_2O_3}$ B $\xrightarrow[H_2SO_4]{Conc.}$ C $\xrightarrow[boil]{water}$ D. In this reaction D is– **Iso - propyl alcohol**
- The product that is formed when benzene diazonium salt is treated with H_2O– **Phenol**
- Lower alcohol are– **Soluble in water**
- Methanol and ethanol are miscible in water due to– **Hydrogen bonding character**
- The best reagent to convert pent - 3 - en - 2 - ol into pent - 3 - en - 2 - one is–**Pyridinium chlorochromate**
- Benzoquinone is prepared by reaction of phenol with– **$Na_2Cr_2O_7$,H_2SO_4**
- The major product obtained on reaction of phenol with sodium hydroxide and carbon dioxide is– **Salicylic acid**

Search on TG: @apna_pdf

@apna_pdf

- Tertiary butyl alcohol gives tertiary butyl chloride on treatment with– **Conc. HCl/anhydrous $ZnCl_2$**
- R - OH + HX → RX + H_2O
  In the above reaction, the reactivity of alcohols is–
  Tertiary > Secondary > Primary
- Lucas reagent reacts fastest with–

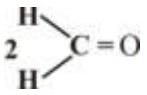


- In the reaction,

$$C_2H_5OH \xrightarrow[ZnCl_2]{HX} B \xrightarrow{Na/ether} C,\ C \text{ is} -$$

Butane

- Dehydration of n - alcohol with Al_2O_3 gives–
  But - 1 - ene
- $CH_2OH - CH_2OH$ on heating with periodic acid gives–



- Identify B in the sequence–

$$CH_3CH_2CH_2OH \xrightarrow{PCl_2} A \xrightarrow{ale.KOH} B$$

Propene

- One can differentiate between C_2H_5OH and CH_3OH–
  $Na_2CO_3+I_2$
- Chlorobenzene $\xrightarrow{\text{reaction X}}$ Phenol $\xrightarrow{\text{reaction Y}}$ salicylaldehyde X and Y reactions are respectively–
  Dow and Reimer – Tiemann
- Phenol is heated $CHCl_3$ and alcoholic KOH when salicylaldehyde is produced. This reaction is known as– **Reimer - Tiemann reaction**
- Phenol is treated with bromine water and shaken well. The white precipitate formed during the process is–
  2, 4, 6 - tribromophenol
- Hydrogenation of phenol gives– **Cyclohexanol**
- Phenol $\xrightarrow{X}$ forms a tribromo derivative. X is–
  Bromine in water
- At low temperature, phenol reacts with Br_2 in CS_2 to form– **o and p – Bromophenol**
- Aspirin is an acetylation product of–
  o - Hydroxy benzoic acid
- On oxidation gives a ketone– **Secondary alcohol**
- When 3, 3-dimethyl-2-butanol is heated with H_2SO_4, the major product obtained is–
  2, 3-dimethyl-2-butene
- The groups which when present in para position tend to decrease the acidity of phenol are– **$-OCH_3$**
- The strongest acid among the aromatic compounds is– **p-nitrophenol**
- An alkene obtained by the dehydration of an alcohol (A) on ozonolysis gives two molecules of acetaldehyde for each molecule of the alkene. The alcohol (A) is– **$CH_3CH_2CHOHCH_3$**
- Phenol is used as a starting material for the manufacture of a drug is known as– **Aspirin**
- Higher pk_a value has– **Phenol**
- $CO + H_2 \xrightarrow[X(\text{catalyst})]{300^0C/300atm} CH_3OH$
  The catalyst X is– **Cr_2O_3/ZnO**

Some Commercially Important Alcohols

- The compounds that will react with sodium hydroxide solution in water is– **C_6H_5OH**
- Phenol is less acidic than– **o-nitrophenol**
- Most acidic is– **m-Chlorophenol**
- Denaturated alcohol is– **Ethanol + methanol**
- The enzyme which can catalyse the conversion of glucose to ethanol is– **Zymase**
- Denaturated alcohol is commonly known as–
  Methylated spirit
- Starch is converted to ethanol by fermentation. The sequence of enzyme used are–
  Diastase, Maltase, zymase
- In wash or wort, the percentage of ethyl alcohol present is– **6-10%**
- Wood spirit is known as– **Methanol**
- Drinking of methyl alcohol mainly cause– **Blindness**
- The alcohols that gives the best yield of dialkyl ether on being heated with a trace of sulphuric acid–
  1-pentanol

Ethers

- Ether is obtained from ethyl alcohol in presence of H_2SO_4 at– **413 K**
- Ethers have lower boiling points than their corresponding isomeric alcohols because of–
  Hydrogen bonding in alcohols that is absent in ethers due to low polarity
- The products that shown by the reaction of methoxyethane with HI– **$C_2H_5OH + CH_3I$**
- The ether that undergoes electrophilic substitution reaction is– **$C_6H_5OCH_3$**
- Anisole on reaction with chloromethane in presence of anhydrous $AlCl_3$ gives–
  o-methyl anisole and p-methyl anisole
- Order of esterification of alcohols is– **$1^0 > 2^0 > 3^0$**
- Ethyl chloride is converted into diethyl ether by–
  Williamson's synthesis
- Willamson's synthesis of preparing dimethyl ether is a– **S_N2 reaction**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

- Anisole can be prepared by the action of methyl iodide on sodium phenoxide. The reaction is called– **Williamson's reaction**
- Ether is obtained from ethyl alcohol in presence of H_2SO_4 at– **413 K**
- In continuous etherification process, the intermediate obtained is– **Ester of sulphuric acid**
- The major product of the reaction between tert - butyl chloride and sodium ethoxide is– **2 - methyl prop - 1 - ene**
- Dehydration of methyl alcohol with cone. H_2SO_4 yields– **Dimethyl ether**
- In the sequence of reactions $CH_3CH_2CH = CH_2 \xrightarrow{HBr/H_2O_2} Y \xrightarrow{C_2H_5ONa} Z$. Z is– **$CH_3 - (CH_2)_3 - O - CH_2CH_3$**
- The correct order of boiling point is– **$CH_3 - O - CH_3 < C_2H_5 - O - C_2H_5 < C_4H_9OH$**
- When $CH_2 = CH - O - CH_2 - CH_3$ reacts with one mole of HI, the products formed is– **Ethanal**
- The ether that undergoes electrophillic substitution reaction is– **$C_6H_5OCH_3$**
- An ether on hydrolysis with dil H_2SO_4 gives two products which are successive members of a homologous series. The ethers may be– **Ethyl methyl ether**

EXAM POINT

Classification

The general name of the compound formed by the reaction between aldehyde and alcohol is– **Acetal**	**Karnataka CET-17.06.2022, Shift-II**
The formula of ethyl carbinol is– **$CH_3CH_2CH_2OH$**	**VITEEE- 2010**
The general molecular formula, which represents the homologous series of alkanols is– **$C_nH_{2n+2}O$**	**(AIPMT -2006)**
The conversion of ethyl chloride into diethyl ether takes place by– **Williamson's synthesis**	**BCECE-2007 AIPMT -1999**
Alcohols with molecular formula $C_nH_{2n+2}O$ are isomeric with_____– **Ethers**	**AP EAPCET 20.08.2021 Shift-II**
Name the catalyst used in commercial method of preparation of phenol.– **Cobalt naphthenate**	**MHT CET-2016**

Nomenclature

Picric acid is:– **2,4,6 trinitrophenol**	**COMDEK-2008 (AIIMS-2000)**
Phenol on reaction with Br_2 gives– **2,4,6-tribromophenol**	**UPTU/UPSEE-2006 UP CPMT-2005**
The Structure of diethyl ether is confirmed by :– **Williamson's synthesis**	**MPPET-2013**
Carbolic acid is– **C_6H_5OH**	**BCECE-2007**
Ether show isomerism with :– **alcohol**	**BCECE-2005**
Glycol is– **dihydric alcohol**	**COMEDK 2011**
Number of isomeric alcohols of molecular formula $C_6H_{14}O$, that give positive iodoform test is– **four**	**(Karnataka NEET 2013)**

Structures of functional groups

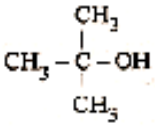
Resorcinol is– **Benzene -1, 3-diol**	**Kerala CEE -03.07.2022**
The reagent which can do the conversion $CH_3COOH \rightarrow CH_3 — CH_2 — OH$ is– **$LiAlH_4$/ether**	**Kerala-CEE-29.08.2021**
Phenol can be distinguished from ethanol by the reagent– **bromine water**	**Karnataka-CET-2018**
Reagent used for the oxidation of allyl alcohol to acrolein is– **active MnO_2**	**JCECE - 2015**
Alcoholic beverages contain:– **ethyl alcohol**	**UPTU/UPSEE-2006**
Lucas reagent is– anhy. $ZnCl_2$ + conc. HCl	**BITSAT-2008, JCECE-2008, 2007 AIIMS-2000, AIPMT -1998 SRMJEEE-2009**

Search on TG: @apna_pdf

@apna_pdf

Lucas test is used for the detection of– alcohols	**Karnataka CET-2018 AIIMS-2002**
The relative ease of dehydration of alcohols follows following order– tertiary > secondary > primary	**J & K CET-2014, MHT CET-2010**
Ethyl alcohol exhibits acidic nature on reaction with:– **Sodium metal**	**AP-EAMCET (Medical), 2006 CG PET -2005, AIIMS-1994**
An alkyl halide reacts with an alkoxide, the products is– **ether**	**A.P. EAMCET-1998, 1996 AIPMT -1999**
The alcohol manufactured from water gas is:– **CH_3OH**	**CG PET-2008, Punjab MET-2005 BCECE-2004**
In the Victor-Meyer's test, the colour given by 1°, 2° and 3° alcohols are respectively.– red, blue, colourless	**(AIIMS-2017)**
The decrease in stability of cyclohexanol is due to– 1, 3-diaxial interaction	**SRMJEEE – 2016**
Equatorial alcohol is more stable than axial alcohol to an extent of– 0.7 kcal	**SRMJEEE – 2015**
Primary, secondary and tertiary alcohols are distinguished from one another by– Lucas test	**MPPET-2008**
Phenol can be distinguished from ethyl alcohol using– $FeCl_3$	**COMEDK-2012**
Primary, secondary and tertiary alcohols may be distinguished by– Victor-Meyer test	**JCECE - 2011**
Denatured alcohol is– ethanol + methanol	**Karnataka-CET-2007**
Phenol cannot be distinguished from ethanol by:– sodium	**Kerala-CEE-2006**

Alcohols and phenols

The alcohols reacts instantaneously with Lucas reagent is- 	**NEET-05.05.2024**
In Kolbe's reaction the reacting substances are– **Sodium phenoxide and CO_2**	**Karnataka CET-17.06.2022, Shift-II**
The major product obtained when ethanol is heated with excess of conc. H_2SO_4 at 443K is– **ethene**	**Karnataka CET-17.06.2022, Shift-II**
The difference in the reaction of phenol with bromine in chloroform and bromine in water medium is due to :– **Polarity of solvent**	**JEE Main 26.07.2022, Shift-I**
When vapour of a secondary alcohol is passed over heated copper at 573 K, the product formed is– **a ketone**	**(Odisha NEET 2019)**
2, 4, 6-Tribromophenol is formed when the organic compound 'X' reacts with 'Y' in the presence of 'Z'. What are X, Y and Z respectively?– **C_6H_5OH; Br_2; H_2O**	**SRMJEEE – 2012**
The alcohol obtained during the hydrolysis of groundnut oil is– **propane-1,2,3-triol**	**COMEDK 2012**
Ortho-Nitrophenol is less soluble in water than p - and m - nitrophenols because:– **O- Nitrophenol shows intramolecular H-bonding**	AIIMS 25 May 2019 (Evening)
n-Propanol on treatment with concentrated HBr gives P. The product P on reaction with KCN gave the product Q. The product Q on heating with aqueous acidic solution. Furnished the product R. The product 'R' is– **Butanoic acid**	**TS EAMCET-18.07.2022, Shift-II**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

The alcohol that produces turbidity immediately with Lucas reagent at room temperature is– **2-methylpropan-2-ol**	**BCECE-2018, MH CET-2018, 2011 Manipal-2017, UP CPMT-2005 JIPMER-2004, J&K CET-1998 AIPMT-1989**
Salicylaldehyde is obtained when phenol is heated with $CHCl_3$ and aqueous NaOH. This reaction is known as- Reimer-Tiemann reaction	**AIIMS-27 May, 2018 (E) GUJCET-2008**
If a mixture of anhydrous glycerol and excess of oxalic acid is heated at 110 °C, then it will produce– formic acid	**Tripura JEE-2019, JIPMER-1995**
An unknown alcohol is treated with the 'Lucas reagent' to determine whether the alcohol is primary, secondary or tertiary. Which alcohol reacts fastest and by which mechanism?– Tertiary alcohol by SN1	**UPCPMT-2015, JEE Main-2013**
Glycerol when reacts with potassium hydrogen sulphate at 473 K – 503 K to forms– acrolein	**J & K CET-2010, AIPMT - 1994**
The best method for the conversion of an alcohol into an alkyl chloride is by treating the alcohol with– $SOCl_2$ in presence of pyridine	**JIPMER-2011, Karnataka CET-2009**
The method is used to prepare salicylic acid from phenol is – Reimer-Tiemann reaction	**GUJCET-2022**
Phenyl magnesium bromide reacts with methanol to give– a mixture of benzene and Mg(OMe) Br	**AIEEE-2008, 2006**
The reagent that is used to convert Allyl alcohol to propenal– PCC	**GUJCET-2021**
Reaction between acetone and methyl magnesium chloride followed by hydrolysis will give– tert-butyl alcohol	**(NEET 2020)**
Aniline on heating with chloroform and ethanolic potassium hydroxide leads to the formation of– phenyl isocyanide	**JHARKHAND – 2019**
The phenol is treated with chloromethane in presence of $AlCl_3$ we get– mixture of o-and p-cresol	**COMEDK-2019**
A compound $C_5H_{10}O$(A) forms a phenylhydrazone and gives negative tollen's test and a positive iodofom reaction. It also given n-pentane on reduction. The compound (A) is– 2- pentanone	**AMU-2018**
$ClCH_2CH_2OH$ is stronger acid than CH_3CH_2OH because of:– – I effect of Cl disperses negative charge on O atom to produce more stable anion.	**(AIIMS-2016)**
Grignard reagent reacts with ketone, it yields– 3^0 alcohol	**UPTU/UPSEE-2016**
The reaction of phenol with excess of bromine water:– 2, 4, 6 - tribromophenol	**MPPET - 2012**
Ethylene glycol, on oxidation with per-iodic acid, gives– Formaldehyde	**VITEEE-2019**
Ethylene glycol gives oxalic acid on oxidation with– alkaline KMnO4	**VITEEE- 2008**
Ethyl alcohol is heated with conc. H2SO4, the reaction product is– C2H4	**VITEEE- 2008**
The ionization constant of phenol is more than that of ethanol because– phenoxide ion is stabilized by resonance	**COMEDK-2012 [BITSAT-2014]**
Phenols are highly acidic compared to alcohols due to– phenoxide ion is resonance stabilized.	**COMEDK-2014 BCECE-2007**
Formation of diethyl ether from ethanol is based on a :– dehydration reaction	**BCECE-2006**
Ortho-nitrophenol is less soluble in water than p- and m-nitrophenols because– o-nitrophenol shows intramolecular H-bonding	**AIEEE-2012**
Ethanol and I_2 are heated in presence of Na_2CO_3 the yellow crystals obtained are of– CHI_3	**J & K CET-(2013)**
Phenol on treatment with conc. HNO_3 gives– 2, 4, 6 -trinitrophenol	**J & K CET-(2013)**

Search on TG: @apna_pdf

Acetic acid will be obtained on oxidation of– ethanol	**J & K CET-(2005)**
Phenol reacts with bromine in chloroform at low temperature to give– mixture of ortho and para bromophenol	**J & K CET-(2010)**
Ethanolic KOH gives– dehydrohalogenation reactions	**MHT CET-2010**
The phenol is distilled with Zn dust it gives– **benzene**	**CG PET -2007**
Trichloroacetaldehyde was subjected to Cannizzaro's reaction by using NaOH. The mixture of the products contains sodium trichloroacetate ion and another compound. The other compound is– **2,2,2-trichloroethanol**	(AIEEE-2011)
Phenol, first reacts with concentrated sulphuric acid and then with concentrated nitric acid gives– **o– nitrophenol**	(AIEEE-2008)
Phenol is heated with a solution of mixture of KBr and $KBrO_3$. The major product obtained is– **2, 4, 6- tribromophenol**	
Phenol reacts with chloroform in presence of– **KOH**	**JIPMER-2005**
The conversion of m-nitrophenol to resorcinol involves respectively– **reduction, diazotization and hydrolysis**	**Karnataka-CET-2011**
Isopropyl benzene is oxidized in the presence of air to compound 'A'. When compound A is treated with dilute mineral acid, the aromatic product formed is– **phenol**	**Kerala-CEE-2013**
3-methylpentan-3-ol will be prepared from– **ethyl ethanoate and ethyl magnesium bromide**	**MHT CET-2011**
Phenol gives characteristic colouration with– **aqueous $FeCl_3$ solution**	**MHT CET-2011**
In the reaction, 2A + dry silver oxide $\xrightarrow{\Delta}$ ether + 2AgX. A is a/an– **alkyl halide**	**MHT CET-2008**
The cleavage of an aryl-alkyl ether with cold HI gives:– **phenol and alkyl iodide**	**UPTU/UPSEE-2006**
Phenol reacts with dilute nitric acid at normal temperature to form– **o-and p-nitrophenol**	**UPTU/UPSEE-2010**
Boiling water reacts with $C_6H_5N_2^+Cl^-$ to given– **Phenol**	**WB-JEE-2010**
In Williamson synthesis if tertiary alkyl halide is used then– **alkene is the only reaction product**	**VITEEE-2018**
Self condensation of two moles of ethyl acetate in the presence of sodiumethoxide after acidification yields– **acetoacetic ester**	**VITEEE- 2011**
Sometimes explosion occurs while distilling ethers. It is due to the presence of– **peroxides**	**VITEEE- 2011**
When acetaldehyde is treated with CH_3MgBr and hydrolysed, the final product obtained is– **isopropyl alcohol**	**SRMJEEE – 2009**
Alcohols have higher boiling points than the corresponding hydrocarbons and alkyl halides, this is due to the fact that alcohols– **are involved in hydrogen bonding**	**SRMJEEE – 2011**
The conversion of O-acylated phenol in presence of $AlCl_3$ to C-acylated phenol is an example for which type of organic reaction– **molecular rearrangement**	**AP-EAMCET- (Engg.) - 2010**
The products formed in the reaction of phenol with Br_2 dissolved in CS_2 at 0^oC are- **o-bromo and p-bromophenols**	**AP-EAMCET (Engg.) 2013**
Isopropyl benzene on air oxidation in the presence of dilute acid gives:–**C_6H_5OH**	**(AIIMS-2006)**
An aromatic ether that is not cleaved by HI even at 525 K, The compound is– **$C_6H_5OC_6H_5$**	**(AIIMS-2012)**
The formation of diethyl ether from ethanol is based on:– **Dehydration reaction**	**(AIIMS-2009)**
$CH_3OC_2H_5$ and $(CH_3)_3$ C–OCH_3 are treated with hydroiodic acid. The fragments obtained after reactions are– **$CH_3I + HOC_2H_5$;$(CH_3)_3CI + HOCH_3$**	**(AIIMS-2007)**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

One mole of compound A, on heating with excess of conc. HI gave two moles of ethyl iodine. Compound A is– **ethoxyethane**	**AMU-2013**

Some commercially important alcohols

A fruity smell is obtained by the reaction of ethanol with– **CH_3COOH**	**BCECE-2007 BHU-2000**
Phenol on oxidation in air gives :– **quinone**	**AP-EAMCET (Engg.) 2015**
Purity of ether before its use as an anesthetic agent is tested by– **KI and starch**	**SCRA 2012**
Cyclopentanol on reaction with NaH followed by CS_2 and CH_3I produces a/an– xanthate	**WB-JEE-2019**
The synonym for water gas used in the production of methanol is:– syn gas	**AIIMS 25 May 2019 (Morning)**
Salicylic acid on heating with soda lime gives– **phenol**	**COMEDK 2011**
When phenol is distilled with Zn dust it gives– benzene.	**SRMJEEE – 2010**
When glycerol is treated with excess of HI, it produces– **2-iodopropane**	**AIPMT-Mains 2010 VITEEE 2012**
Glucose gives silver mirror with Tollen's reagent, it shows the presence of– an aldehydic group	**JCECE - 2016**
Ketal is formed by– Glycol with acetone	**VITEEE-2016**
Power alcohol is a mixture of– **80% petrol + 20% ethanol + small quantity of benzene**	**Karnataka-CET-2012**
Oil is winter green is– **an ester**	**Karnataka-CET-2012**
Waxes are esters of– **long chain alcohols and long chain fatty acids**	**KARNATAKA-CET, 2008**
Phenol is heated with phthalic anhydride in the presence of conc. H_2SO_4. The product gives pink colour with alkali. The product is– phenolphthalein	**VITEEE-2012**
The compound that gives hydrocarbon on distillation with zinc dust is– o-cresol	**COMEDK-2011**
Glycerol on oxidation with bismuth nitrate forms– Meso oxalic acid	**J & K CET-(2009)**
Glycerol is an alcohol that can be classified as– trihydric alcohol	**J & K CET-(2005)**
Phenol is converted into benzene in presence of– **Zn**	**JCECE - 2018**
Rectified spirit is a mixture of– **95.87% ethyl alcohol + 4.13% water**	**(AIIMS-2012)**
Zeisel method is used to estimate– **methoxy group**	**AMU-2012**
Fat on hydrolysis gives alcohol in form of – **Glycerol**	**BCECE-2005**

Ethers

The reagent is used for bromination of methyl phenyl ether– **Br_2/CH_3COOH**	**GUJCET-2016, 2015**
Most reactive alocohol towards esterification is– Primary alcohol	**UPTU/UPSEE-2018**
Dehydration of methyl alcohol with concentrated H_2SO_4 yields– **dimethyl ether**	**UP CPMT-2009**
The alkyl ether is heated with HI, it gives– **phenol and alkyl halide**	**UP CPMT-2009**
The products formed in the following reaction $C_6H_5 - O - CH_3 + HI \xrightarrow{heat}$ are– **$C_6H_5 - OH$ and $CH_3 - I$**	**NEET-2017 J & K CET-(1998)**
Diethyl ether $\xrightarrow[2.KCN]{1.HI,\Delta}[A]\xrightarrow{LiAlH_4}[B]$ Compound [B] gives carbylamines test. What are the structure of [A] and [B]?– **Propane nitrile, propyl Amine**	**CG PET -2019**
Etherates are– **complexes of ethers with Lewis acid**	**JCECE - 2014**
Ether on reacting with P_2S_5 form– **thioether**	**UP CPMT-2012**
Diethyl ether on heating with conc. HI gives two moles of– **ethyl iodide**	**CG PET -2007**

Search on TG: @apna_pdf

@apna_pdf

25. Aldehydes, Ketones and Carboxylic Acids

Nomenclature and structure of carbonyl group

- Reaction of aldehyde with HCN followed by hydrolysis give a compound which shows– **Optical isomerism**
- The hybridization of the C - atom of the carboxyl group is– **sp^2**
- Polarisation in acrolein can be described as– $\overset{+\delta}{C}H_2 = CH - \overset{-\delta}{C}HO$
- The general formula of both aldehyde and ketone is– **$C_nH_{2n}O$**
- IUPAC name of CCl_3CHO is– **2,2,2-trichloroethanal**
- The ..... is mixed ketone– **Acetophenone**
- IUPAC name of α-hydroxybutyraldehyde is– **2-Hydroxy butanal**
- The formula $C_5H_{10}O$ represents– **An aldehyde and an symmetrical as well as an unsymmetrical ketone**

Preparation of aldehydes and ketones

- The carbonyl compound can give Cannizzaro reaction– **$(CH_3)_3CCHO$**
- Dry heating of calcium acetate gives– **Acetone**
- The ..... pathways produces 2-hexanone– **1-Hexyne is treated with Hg^{2+}/dil. H_2SO_4**
- An alkene of molecular formula C_9H_{18} on ozonolysis gives 2,2-dimethylpropanal and butan-2-one, then the alkene is– **2,2,4-trimethylhex-3-ene**
- Acetyl chloride is reduced with $LiAlH_4$, the product formed is– **Ethyl alcohol**
- The compound that will undergo self-aldol condensation in the presence of cold dilute alkali– **CH_3CH_2CHO**
- The compounds that undergoes both Cannizaro and Aldol reaction– **$(CH_3)_2CH.CHO$**
- The oxidation of Toluene to Benzaldehyde by Chromyl Chloride is called– **Etard reaction**
- $A \xrightarrow[(ii)H_3O^+]{(i)CH_3MgBr} R \xrightarrow[(ii)\Delta]{(i)Dil.NaOH}$ 4 - methylpent - 3 - en - 2 - one. 'A' is– **Ethane nitrile**
- The reagent used in Gatterman Koch aldehyde synthesis is– **CO + HCl**
- In the reaction, $HCOOC_2H_5 \xrightarrow[ether]{CH_3MgI} X \xrightarrow{H_3O^+} Y$, Y is: **Acetaldehyde**
- The compounds with molecular formula C_5H_{10} yields acetone on ozonolysis– **2–Methyl–2–butene**
- A carbonyl compound reacts with hydrogen cyanide to form cyanohydrin which on hydrolysis forms a racemic mixture of α-hydroxy acid. The carbonyl compound is– **Acetaldehyde**
- The oxidation of toluene with CrO_3 in the presence of $(CH_3CO)_2O$ gives a product A, which on treatment with aqueous NaOH, produces– **C_6H_5CHO**
- When aniline reacts with oil of bitter almonds (C_6H_5CHO) condensation takes place and benzal derivative is formed. This is known as– **Schiff's base**
- Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the presence of– **A vinyl group**
- Propanone can be prepared from ethyne by– **Passing a mixture of ethyne and steam over a catalyst, magnesium at 420^0C**
- Benzoyl chloride on reduction with H_2/Pd-$BaSO_4$ produces– **Benzaldehyde**
- Aldehydes other than formaldehyde react with Grignard reagent to give addition products which on hydrolysis give– **Secondary alcohols**
- When propanal reacts with 2-methylpropanal in presence of NaOH, four different products are formed. The reaction is known as– **Cross aldol condensation**
- In the reaction, Acetonitrile $\xrightarrow{C_2H_5MgI} A \xrightarrow{HOH} B$; B is– **Butan-2-one**
- The correct order of increasing acidic strength is– **Ethanol < phenol < acetic acid < chloroacetic acid**
- $CH_3–CH_2C \equiv N \xrightarrow{X} CH_3CH_2CHO$ The compound X is– **$SnCl_2$/HCl/H_2O, boil**

TEAMSPY

Search on TG: @apna_pdf

@apna_pdf

- Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as– **Cross Aldol condensation**
- $R–CN \xrightarrow[(ii)\ H_2O]{(i)\ DIBAL,-H} R–Y$

  Consider the above reaction and identify "Y". **–CHO**
- The major product of the reaction is–

  $R-C\equiv N \xrightarrow[(2)\ H_2O]{(1)\ AlH(i-Bu)_2}$ **RCHO**

Physical properties and chemical properties

- The reaction of formaldehyde with magnesium methyl bromide by hydrolysis gives– **Primary alcohol**
- The compound that is obtained when acetadehyde is treated with dilute solution of caustic soda– **Aldol**
- The reactions that converts acetone into hydrocarbon having same number of carbon atoms– **Wolff - Kishner reaction**
- When propanal reacts with 2-methyl propanal in presence of NaOH, four different products are formed. The reaction is known as : (excluding stereoisomers)– **Cross aldol condensation**
- Benzyl alcohol and sodium benzoate is obtained by the action of concentrated sodium hydroxide on benzaldehyde. This reaction is known as– **Cannizzaro reaction**
- Clemmensen reduction of a ketone is carried out in the presence of– **Zn-Hg with HCl**
- The number of total final products formed in given reaction $CH_3-CHO \xrightarrow[\Delta]{OH^-}$ **2**
- Aromatic aldehydes undergoes condensation on heating with an ethanolic solution of KCN. This reaction is called as– **Benzoin condensation**
- Ketone is much less soluble than aldehyde because of– **Steric hindrance, Hydrogen bonding**
- There is a large difference in boiling points of butanal and butan - 1 - ol due to– **Intermolecular hydrogen bonding in butan -1-ol**
- CH_3CHO and $C_6H_5CH_2CHO$ can be distinguish chemically by– **Iodoform test**
- The product formed in Aldol condensation is– **A beta-hydroxy aldehyde or a beta-hydroxy ketone**
- In Tollen's test, aldehydes– **Are oxidised to acids**
- The compound will undergo self aldol condensation in the presence of cold dilute alkali– **CH_3CH_2CHO**
- The compounds with give positive test with Tollen's reagent– **Acetaldehyde**
- First product of the reaction between RCHO and NH_2NH_3– **$RCH = NNH_2$**
- Regarding the physical properties of carbonyl compound is– **Higher aldehydes are more fragrant**
- Most reactive to give nucleophilic addition is– **FCH_2CHO**
- The addition of HCN to carbonyl compounds is an example of– **Nucleophilic addition**
- Hydrocarbons are formed when aldehydes and ketones are reacted with amalgamated zinc and conc. HCl. The reaction is called– **Clemmensen reduction**
- The test to differentiate between pentan-2-one and pentan-3-one is– **Iodoform test**
- The best oxidising agent for oxidation of– $CH_3–CH = CH–CHO$ to $CH_3–CH=CH–COOH$ is– **Tollens' reagent**
- An organic compound of molecular formula C_3H_6O did not give a silver mirror with Tollens' reagent but give an oxime with hydroxylamine. It may be – **CH_3COCH_3**
- Distinguish aldehydes and ketones can be used– **Fehling's solution**
- Propanal on treatment with dilute sodium hydroxide gives– **$CH_3CH_2CH(OH)CH(CH_3)CHO$**
- The compound that is obtained when acetaldehyde is treated with dilute solution of caustic soda– **Aldol**
- The compounds that will undergo self aldol condensation in the presence of cold dilute alkali is– **CH_3CH_2CHO**
- The compounds that will undergo Cannizzaro reaction is– **C_6H_5CHO**
- The aldehydes that will show Cannizzaro reaction– **HCHO, C_6H_5CHO, $(CH_3)_3CCHO$**
- An organic compound (X) with molecular formula $C_9H_{10}O$ gives positive 2, 4-DNP and Tollens' tests. It undergoes Cannizzaro reaction and on vigotous oxidation it gives 1,4-benzenedicarboxylic acid. Compound (X) is– **p-ethylbenzaldehyde**
- The correct steps to convert acetaldehyde to acetone– **Oxidation, $Ca(OH)_2$, Heat**
- Hypnotic is– **Paraldehyde**
- α-Hydroxypropanoic acid can be prepared from ethanal by the steps given in the sequence– **Treat with HCN followed by acidic hydrolysis**
- ..... compound will exhibits positive Fehling test as well as iodoform test– **Ethanal**
- Dimethyl ketones are usually characterized through– **Iodoform test**

Search on TG: @apna_pdf

@apna_pdf

- The reagent(s) that can be used to distinguish acetophenone from benzophenone is– **I_2 and Na_2CO_3**
- Suitable reagents to convert methyl acetate into ethanol is– **$LiAlH_4$**
- The compound that neither forms semicarbozone nor oxime is– **$CH_3CONHCH_3$**
- The compounds that is most reactive towards nucleophilic addition reactions is–

$$CH_3 - \overset{\overset{O}{\|}}{C} - H$$

- Acetaldehyde and Propyne can be distinguished by– **I_2/NaOH**
- The compound on treatment with $LiAlH_4$ will give a product that will give positive iodoform test is– **CH_3COCH_3**
- The most reactive compound towards formation of cyanohydrin on treatment with KCN followed by acidification is– **p-nitrobenzaldehye**
- The most reactive to give nucleophilic addition is– **FCH_2CHO**
- Iodoform test gives– **$CH_3COCH_2CH_3$**
- The reagent with which both acetaldehyde and acetone react is– **Grignard Reagent**
- The product formed when acetone reacts with nitro methane in the presence of a base is–

$$CH_3 \diagdown \quad C = CHNO_2 \quad \diagup CH_3$$

- Ethyl methyl ketone on reduction with zinc amalgam and Conc. HCl gives– **n-butane**
- The end product (z) in the given sequence of reaction is–

$$CH_3CH = CHCHO \xrightarrow{NaBH_4} X \xrightarrow[ZnCl_2]{HCl} Y \xrightarrow[(ii)H_3O^+]{(i)KCN} Z$$

$CH_3CH = CH\ CH_2COOH$

- Esterification is a reverse of– **Hydrolysis**
- In the reaction, $RCN \xrightarrow[(2)NaOH]{(1)\ HOH} A + NH_3$; A is a – **Sodium alkanoate**

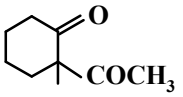
Nomenclature and structure of carboxyl group

- The IUPAC name of phthalic acid– **Benzene-1,3-dicarboxylic acid**
- Acetic acid exist in dimer state in benzene due to– **Hydrogen bonding**

Methods of preparation of carboxylic acids

- Acetic acid is obtained when– **Acetaldehyde is oxidised with potassium dichromate and sulphuric acid**
- A liquid was mixed with ethanol and a drop of concentrated H_2SO_4 was added. A compound with a fruity smell was formed. The liquid was– **CH_3COOH**
- Treatment of benzoic acid with $Cl_2/FeCl_3$ will give– **m-chlorobenzoic acid**
- ..... will react with $NaHCO_3$ solution salt and carbon dioxide– **Acetic acid**
- Ethyl bezoate can be prepared from benzoic acid by using– **Ethyl alcohol and dry HCl**
- Hydrolysis of hydrocyanic acid gives– **Methanoic acid**
- In the reaction Ethanol $\xrightarrow{PCl_3} A \xrightarrow{KCN} B \xrightarrow{H_3O^+} C$ C may be– **Propanoic acid**
- The compounds that is most acidic– **FCH_2COOH**
- The reactions that in which formic acid differs from acetic acid– **Reduces ammonical silver nitrate**
- In HVZ reactions, the substitution takes place at– **Carbon atom attached to carboxyl group**
- Main product of the reaction, $CH_3CONH_2 + HNO_2 \rightarrow$ ..... is– **CH_3COOH**
- The reagent in Friedel - craft reaction is– **RCOCl**
- Carboxylic acid reacts with diazomethane to yield– **Esters**
- $CH_3CH_2COOH \xrightarrow[red\ P_4]{Cl_2} X \xrightarrow[KOH]{Alc} Y$. The compound Y is– **$CH_2 = CHCOOH$**
- From given set of reactions :

The compound A is–



- The final product (Y) in the sequence of chemical reaction is

$$CH_3OH \xrightarrow[300^0C]{Cu} X \xrightarrow{NaOH} Y + CH_3OH$$

Sodium salt of carboxylic acid

- Saponification of ethyl benzoate with caustic soda as alkali gives– **Sodium benzoate and ethanol**
- Compound $Ph - O - \overset{\overset{O}{\|}}{C} - Ph$ can be prepared by the reaction of– **Phenol and benzoyl chloride in the presence of pyridine**
- When $CH_2 = CH - COOH$ is reduced by $LiAlH_4$, the compound obtained is– **$CH_2 = CHCH_2OH$**

Search on TG: @apna_pdf

@apna_pdf

Physical properties and chemical properties

- The carboxylic acids that is highly insoluble in water– **Decanoic acid**
- The compounds that would have the smallest value for pK_a– **$CH_3CH_2CF_2COOH$**
- –OH group present in alcohols is neutral while it is acidic in carboxylic acid because–

  In carboxylic acid –OH group is attached to electron withdrawing carbonyl group
- The carboxylic acid is treated with lithium aluminium hydride, it happens–

  Primary alcohol is formed
- Acetic acid can be halogenated in presence of phosphorus and chlorine. Formic acid cannot be halogenated with same way because of–

  Presence of α-H atom in acetic acid
- HVZ reaction will not undergo–

  2,2-Dimethylpropanoic acid
- The compound used as a preservative, for food products such as tomato ketchup and fruit juices, is–

  Sodium benzoate
- The IUPAC name of the organic compound formed in the chemical reaction is–

  Acetone $\xrightarrow[(ii)\ H_2O,H^+]{(i)\ C_2H_5MgBr,\text{dry ether}}$ product

  2-Methylbutan-2-ol
- Nucleophilic attack on carbonyl carbon changes its hybridisation from– **sp^2 to sp^3**
- Carboxylic acids have higher boiling points than aldehydes, ketones and even alcohols of comparable molecular mass. It is due to their–

  Formation of intermolecular H-bonding
- The ..... compound gives benzoic acid on hydrolysis– **Benzoyl chloride**
- Aspirin is an acetylation product of–

  o-Hydroxybenzoic acid
- The OH group of an alcohol or carboxylic acid can be replaced by –Cl using– **Phosphorus Pentachloride**
- The oxidation of benzene by V_2O_5 in the presence of air produces– **Maleic anhydride**
- When HCOOH acid is heated with conc. H_2SO_4, the gas evolved is– **CO**
- The major product obtained on reaction of phenol with sodium hydroxide and carbon dioxide is–

  Salicylic acid
- In esterification– **OH^- of acid is replaced by RO-group**
- The reaction

  $CH_3COOH + Cl_2 \xrightarrow{P} ClCH_2COOH + HCl$

  is called– **Hell-Volhard-Zelinsky reaction**
- Compound 'X' C_4H_8O that gives 2, 4-DNP derivative and positive iodoform test is–

  Tartaric acid
- ..... is optically active–
- The ..... acids has the smallest value of dissociation constant– **$BrCH_2CH_2COOH$**
- The relative reactivities of acyl compounds towards nucleophilic substitution are in the order of–

  Acyl chloride > Acid anhydride > Ester > Amide
- A mixture of benzaldehyde and formaldehyde on heating with 50% NaOH solution gives–

  Benzyl alcohol and sodium formate
- Base catalysed aldol condensation occurs with–

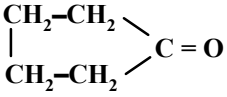
  Propanal
- Least pK_a value is of– **HCOOH**
- Maximum decarboxylation occurs in–

  CH_3COCH_2COOH
- The carboxylic acids that is most acidic in character is–

  o-methyl benzoic acid
- When CH_2 = CH–COOH is reduced with $LiAlH_4$, the compound obtained will be– **CH_2=CH–CH_2OH**
- Acid hydrolysis compounds yields two different organic compounds is –

  $CH_3COOC_2H_5$
- The first compound that is stronger acid than the second, the pairs is– **Phthalic acid, terepthalic acid**
- The compounds that will undergo decarboxylation on heating is–

- The product that is obtained on heating Adipic acid is–

- $RMgX + CO_2 \xrightarrow{\text{dry ether}} Y \xrightarrow{H_3O^+} RCOOH$

  Y is in the above reaction– **$RCOO\ Mg^+X$**
- Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as–

  Cross Aldol condensation
- Carboxylic acids have higher boiling points than aldehydes, ketones and even alcohols of comparable molecular mass. It is due to their–

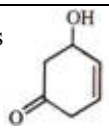
  Formation of intermolecular H-bonding
- The acid that is present in vinegar– **CH_3COOH**

Search on TG: @apna_pdf

@apna_pdf

EXAM POINT

Nomenclature and Structure of Carbonyl group

The chemical name of anisole is– **methoxy benzene**	**KARNATAKA-CET, 2008**
Carboxylic acids have higher boiling points than aldehydes, ketones and even alcohols of comparable molecular mass. It is due to their– **formation of intermolecular H-boding**	**(NEET 2018)**
The IUPAC name for the structure is  **5-Hydroxy cyclohex-3-en-1-one**	**[AIIMS-26 May, 2018 (E)]**
Lower members of aliphatic carboxylic acid are soluble in water. This is due to– **Formation of hydrogen bonds with water**	**Karnataka-CET-2017**

Preparation of Aldehydes and Ketones

Fehling's solution 'A' is- **Aqueous copper sulphate**	**NEET-05.05.2024**
Lucas reagent is.– **Anhyd. $ZnCl_2$ and Conc. HCl**	**Assam-CEE-31.07.2022**
Calcium formate on dry heating yields– **formaldehyde**	**JCECE - 2012**
Bisphenol A is– **Phenol + Acetone**	**JIPMER-2019**
The compound formed when calcium acetate and calcium formate is distilled– **acet**	**Karnataka-CET-2013** **JCECE -2018**
The products (X) and (Y) of the reaction : Cumene $\xrightarrow[(ii)H_2O/H^+]{(i)O_2}(X)+(Y)-$ **Phenol +Acetone**	**AP- EAPCET- 07-09-2021, Shift-I**
Acetonitrile is prepared by treating an alcoholic solution of methyl iodide with– **Potassium cyanide**	**BCECE-2011**
The best reagent to convert pent-3-en-2-ol into pent-3-en-2-one is– **chromic anhydride in glacial acetic acid**	**(AIEEE 2005)**
Two aromatic compounds having formula C_7H_8O which are easily identifiable by $FeCl_3$ solution test (violet colouration) are– **o- cresol and benzyl alcohol**	**WB-JEE-2011**
Identify the reactant– **CO**	**VITEEE- 2008**
The ethanol is heated with conc. H_2SO_4 a gas is produced. The compound formed, when this gas is treated with cold dilute aqueous solution of Baeyer's reagent, is:– **Glycol**	**JEE Main 29.07.2022, Shift-II**
The colour of $Mg(OH)_2$ precipitate formed when it is precipitated in the presence of magneson reagent is– **Blue**	**AP-EAMCET-06.07.2022, Shift-I**

Physical and Chemical Properties

Acetone is distilled with conc. H_2SO_4 at high temperature, the resulting distillate will be– **Mesitylene**	**Tripura JEE-2022** **UP CPMT-2006**
Reaction of acetophenone with hydrazine and KOH at 200°C gives– **Ethyl benzene**	**Assam CEE-2020**
Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as– **Cross Aldol condensation**	**(NEET-2020)**

TEAM SPM

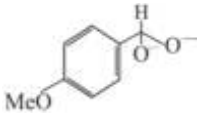
Search on TG: @apna_pdf

@apna_pdf

Aromatic electrophilic substitution reaction that is reversible reaction– **Sulphonation**	**Kerala-CEE-2018**
Phenylacetylene on treatment with $HgSO_4/H_2SO_4$, H_2O produces– **acetophenone**	**Kerala-CEE-2018**
Conversion of acetophenone to benzoic acid can be achieved by reaction with– **I_2/NaOH**	**SCRA - 2009**
Acetaldehyde on oxidation with SeO_2 produces– **glyoxal**	**Tripura JEE-2019 [BITSAT-2005]**
The compound that does not form an adduct with sodium bisulphite is– **acetophenone**	**COMEDK 2011**
Reaction of cyclohexanone with dimethylamine in the presence of catalytic amount of an acid forms a compound of water during the reaction is continuously removed. The compound formed is generally known as– **An enamine**	**UPTU/UPSEE-2007**
Ketone upon treatment with Grignard reagent gives– **tertiary alcohol**	**UPTU/UPSEE-2009**
A reaction between a carbonyl compound and a Grignard reagent is termed as– **nucleophilic addition reaction**	**COMEDK 2014**
Acetophenone is obtained by the dry distillation of– **calcium benzoate and calcium acetate**	**COMEDK 2011**
Reagent X and Y in the following sequence of reactions is: $CH_3CHO \xrightarrow{HNO_3} X \xrightarrow{P_4O_{10}} Y$ – **CH_3CO_2H, $(CH_3CO)_2O$**	**AP-EAMCET (Engg.)-2005**
Acetophenone cannot be prepared easily from– **$C_6H_5CH_3$**	**Karnataka-CET-2014**
Conversion of benzene to acetophenone can be brought by– **Friedel Crafts acylation**	**Karnataka-CET-2013**
Oxidation of toluene to benzaldehyde can be easily carried out with– **CrO_3/acetic anhydride, H_3O^+**	**JEE Main-26.06.2022, Shift-II**
Toluene on treatment with chromic oxide in acetic anhydride at 273K to 283K gives– **benzylidene diacetate**	**Kerala CEE -03.07.2022**
Ethanoic acid undergoes Hell-Volhard Zelinsky reaction but Methanoic acid does not, because of– **presence of $\alpha-H$ atom in ethanoic acid**	**Karnataka CET-17.06.2022, Shift-II**
The product formed when formaldehyde reacts with ammonia is ..... .– **Urotropine**	**AP EAMCET (Engg.) 18.9.2020 Shift-I**
Benzonitrile can be prepared from benzaldehyde on treatment with– **NH_2OH followed by dehydration with acetic anhydride**	**Kerala-CEE-2019**
The melting point of o-hydroxybenzaldehyde is lower than that of p-h ydroxybenzaldehyde because– **o-hydroxybenzaldehyde has intramolecular H-bonding and p-hydroxybenzaldehyde has intermolecular H-bonding.**	**COMEDK 2017**
In the Cannizzaro reaction $2Ph-CHO \xrightarrow{OH^-} Ph-CH_2-OH + PhCO_2^-$ The slowest step is– **the transfer of hydride ion to the carbonyl group**	**VITEEE-2015**
Aldol is– **β-hydroxybutyraldehyde**	**VITEEE- 2010**
Benzoin is– **α- hydroxy ketone.**	**COMEDK-2013**
Carbonyl compounds undergo nucleophilic addition because of– **more stable anion with negative charge on oxygen atom and less stable carbonium ion.**	**(AIIMS-2012)**
Clemmensen's reduction of ketones is carried out in– **Zn–Hg and HCl**	**BCECE-2007**
Acetals are:– **hydroxy aldehydes**	**BCECE-2006**
Aldehyde with $NH_2.NH_2$ forms– **hydrazones**	**BCECE-2008**

Search on TG: @apna_pdf

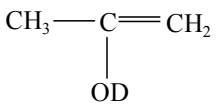
@apna_pdf

In the reaction, $CH_3CHO \xrightarrow{[O]} A \xrightarrow{P,Cl_2} B \xrightarrow{KCN} C \xrightarrow{H^+,H_2O} D$ The end product D is– **malonic acid**	**CG PET- 2012**
The most suitable reagent for the conversion of $R-CH_2-OH \rightarrow R-CHO$ is– **PCC (Pyridinium Chlorochromate)**	**Manipal-2010**
By heating phenol with chloroform in alkali, it is converted into– **salicylaldehyde**	**JCECE - 2009**
The compound on dehydrogenation gives a ketone. The original compound is– **secondary alcohol**	**Karnataka-CET, 2008**
The acetaldehyde is heated with Fehling's solution, it gives red precipitate of– **Cu_2O**	**SRMJEEE – 2009**
The most suitable reagent for the conversion of primary alcohol into aldehyde with the same number of carbon is– **pyridinium chlorochromate**	**Kerala-CEE-2007**
The benzaldehyde is treated with acid anhydride, in the presence of corresponding of the acid, the product obtained is– **cinnamic acid**	**UPTU/UPSEE-2010**
Reaction of formaldehyde and ammonia gives– **hexamethylene tetramine**	**WB-JEE-2011**
Benzaldehyde on reduction with $LiAlH_4$ gives– **benzyl alcohol**	**COMEDK 2011**
In the Cannizzaro reaction given below $2C_6H_5CHO \xrightarrow{OH^-} C_6H_5CH_2OH + C_6H_5COO^-$ The slowest step is :– **The transfer of hydride ion to the carbonyl group**	**Manipal-2020** **BCECE-2018**
The increasing order of the reactivity of the following compounds in nucleophilic addition reaction is : Propanal, Benzaldehyde, Propanone, Butaone– **Butanone < Propanone < Benzaldehyde < Propanal**	**(JEE Main-2020, 3 Sep Shift-II)**
The benzenediazonium chloride in hydrochloric acid reacts with cuprous chloride, then chlorobenzene is formed. The reaction is called– **Sandmeyer reaction**	**[AIIMS-27 May, 2018 (E)]**
The condensation reaction between one equivalent of acetone and two equivalents of benzaldehyde in presence of dilute alkali leads to the formation of– **Dibenzylideneacetone**	**Kerala-CEE-2017**
Clemmensen reduction of ketone is carried out in the presence of– **Zn-Hg with HCl**	**JIPMER-2017**
$R-CN \xrightarrow[(ii)H_3O^+]{(i)SnCl_2+HCl} R-CHO$, the name of the reaction is– **Stephen**	**TS-EAMCET-2016**
In the reaction, $C_2H_5OH \xrightarrow[300°C]{Cu} X$ The molecular formula of X is– **C_2H_4O**	**AP EAMCET/2005**
Oxidation of an alcohol ($C_5H_{12}O$) with acid dichromate gives a mixture of dimethylketone and acetic acid. The alcohol could be– **2-methylbutan-2-ol**	**SRMJEEE-2007**
In a Cannizzaro's reaction, the intermediate that will be the best hydride donor is– 	**AMU-2011**
Aldehydes and ketones give addition reaction with– **hydrogen cyanide**	**BCECE-2011**
A mixture of benzaldehyde and formaldehyde on heating with aqueous NaOH solution gives– **benzyl alcohol and sodium formate**	**BCECE-2010**
The attacking agent in the electrophilic sulphonation of benzene is– **SO_3**	**CG PET- 2012**
Reduction of acetyl chloride with H_2 in presence of Pd gives– **CH_3CHO**	**CG PET -2005**
$CH_3CH_2C \equiv CH \xrightarrow{R}$ butanone-2. R is– **$Hg^{++}/dil.H_2SO_4$**	**JIPMER-2005**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

Benzaldehyde reacts with ammonia to form– **hydrobenzamide**	**MHT CET-2011**
Toluene on treatment with CrO_3 and $(CH_3CO)_2O$ followed by hydrolysis with dil. HCl gives– **benzaldehyde**	**UPTU/UPSEE-2008**
Acetone reacts with HCN to form a cyanohydrins. It is an example of– **Nucleophilic addition**	**TS-EAMCET 09.08.2021, Shift-I** **JCECE - 2017** **VITEEE- 2010**
The enol form of acetone, after treatment with D_2O gives– 	**JCECE - 2015**
Bimolecular reduction of acetone gives– **pinacol**	**BCECE-2011**
The dihydroxy acetone reacts with HIO_4, the product is/are– **HCHO and CO_2**	**JCECE - 2007**
Acetone and propanal are– **functional isomers**	**Karnataka-CET-2013**
The glucose reacts with acetone in acidic medium, the main product is– **dioxopropylidene glucose**	**UPTU/UPSEE-2012**
The acetone is treated with dilute alkali, the product obtained is– **mesityl oxide**	**UPTU/UPSEE-2010**
A carbonyl compound reacts with hydrogen cyanide to form cyanohydrins that on hydrolysis forms a racemic mixture of α-hydroxyl acid. The carbonyl compound is– **acetaldehyde**	**Assam CEE-2019** **AIPMT - 2006**
The reaction $C_6H_6 \xrightarrow[AnhydAlCl_3]{CO+HCl} C_6H_5CHO+HCl$ is known as – **Gattermann – Koch reaction**	**HP CET-2018**
Nitromethane condenses with acetaldehyde to give– **1-nitro-2-propanol**	**SRMJEEE – 2016**
The reagents A and B respectively in the following reactions is- $CH_3COOH \xrightarrow{A} CH_3COCl \xrightarrow{B} CH_3CHO$ **$SOCl_2$, H_2 / Pd - $BaSO_4$**	**AP-EAMCET (Engg.) 2015**
The synthesis crotonaldehyde from acetaldehyde is example of ……. reaction.– **Nucleophilic addition - elimination**	**AP EAMCET (Engg.)-2009**
The acetaldehyde is heated with dilute sodium hydroxide solution, the product is– **aldol**	**J & K CET-(2014)**
Benzaldehyde reacts with ammonia to form– **hydrobenzamide**	**JCECE – 2010**
The compound that forms acetaldehyde, when heated with dilute NaOH, is– **1, 1-dichloroethane**	**Karnataka-CET, 2009** **JIPMER-2011**
2, 4 – DNP test can be used to identify– **aldehyde**	**(JEE Main-2021, 26 Feb Shift-II)**
Fructose reduces Tollen's regent due to .....–**enolisation of fructose followed by conversion to aldehyde by base**	**AP EAMCET (Engg.) 17.09.2020, Shift-II** **VITEEE- 2012**
On heating an aldehyde with Fehling's reagent, a reddish brown precipitate is obtained due to the formation of– **Cu_2O**	**AMU-2018** **MPPET-2012**
In Tollen's test, an aldehyde is treated with ammonical silver nitrate solution. As a result the aldehyde– **is converted to corresponding carboxylate anion**	**Assam CEE-2018**
Benedict solution is a mixture of– **$CuSO_4$+sodium citrate +sodium carbonate**	**COMEDK-2017**
Aldehydes may be distinguished from ketones by the reaction with– **Fehling's solution**	**SRMJEEE – 2011**
$CH_3CH_2C \equiv N \xrightarrow{X} CH_3CH_2CHO$ The compound X is– **$SnCl_2$/HCl/H_2O boil**	**(AIIMS-2008)**

Search on TG: @apna_pdf

@apna_pdf

Methyl ketone is identified by :–	**Iodoform test**	**BCECE-2005**
The compound does not give Fehling solution test?–	**Acetone**	**BCECE-2005**
Acetaldehyde and acetone can be distinguished by:–	**Fehlings solution test**	**[BITSAT-2011]**
Tollens test can be used to distinguish–	**propionaldehyde and acetone**	**J & K CET-(2012)**
The compound that gives both iodoform and Fehling's tests is–	**ethanal**	**J & K CET-(2011)**
The reagent with both acetaldehyde and acetone react is–	**I_2/NaOH**	**Karnataka-CET-2011**
Benzaldehyde and acetone can be best distinguished by using–	**Tollen's reagent**	**Karnataka-CET, 2010**
Catalytic dehydrogenation of a primary alcohol gives a–	**aldehyde**	**Karnataka-CET, 2008**
Aldehydes and ketones are differentiated by using–	**$AgNO_3$ / NH_4OH**	**UP CPMT-2010**
The reagent used to differentiate acetophenone and benzophenone is–	**I_2 + NaOH**	**Assam CEE-2021 [BITSAT-2011]**
Acetophenone and Benzophenone can be distinguished by–	**Aldol condensation**	**[VITEEE–2016]**
An organic compound 'A' burns with a sooty flame. It is negative towards Tollen's reagent test and positive for Borsche's reagent test. The compound 'A' is–	**acetophenone**	**Karnataka-CET-2012**
A ketone gives a yellow precipitate that is treated with I_2 in an alkaline solution. Thus, the ketone is–	**a methyl ketone**	**COMEDK 2016 J&K CET -2012**
The reagent used to distinguish between acetaldehyde and benzaldehyde is–	**Fehling solution**	**Karnataka-CET-2013**
Glucose response to silver mirror test due to the presence of–	**an aldehydic group**	**CG PET -2008**
Aldehyde or ketones is treated with C_6H_5 — NH — NH_2, the product formed is–	**ph**	**MHT CET-2017**
The product formed by the reaction of an aldehyde with a primary amine is–	**Schiff's base**	**(NEET-I 2016)**
The carbonyl compound producing an optically active product by reaction with $LiAlH_4$ is–	**Butanone**	**J & K CET-(2016)**
A mixture of benzaldehyde and formaldehyde is treated with 50% NaOH that yields–	**Sodium formate and benzyl alcohol**	**MHT CET-2015**
A β-hydroxy carbonyl compound is obtained by the action of NaOH on–	**CH_3CHO**	**BCECE-2013**
Reduction of an aldehyde gives–	**Primary alcohol**	**CG PET -2007**
The reaction of benzaldehyde with alkali gives–	**benzyl alcohol + sodium benzoat**	**CG PET -2007**
Ethyl methyl ketone on treatment with a solution of sodium hypochlorite gives chloroform and–	**sodium propanoate**	**J & K CET-(2011)**
Reaction of butanone with methyl magnesium bromide following by hydrolysis gives–	**2-methyl-2 butanol**	**Kerala-CEE-2011**
Distillation of acetone with conc. Sulphuric acid gives–	**Mesitylene**	**WB-JEE-2008**
On treatment of propanone with dilute $Ba(OH)_2$, the product formed is–	**4-hydroxy-4-methyl-2-pentanone**	**VITEEE- 2010**
The unsaturated hydrocarbon that on ozonolysis gives one mole each of formaldehyde, acetaldehyde and methyl glyoxal (CH_3COCHO) is–	**$CH_2 = CH – C(CH_3) = CH – CH_3$**	**[BITSAT – 2010]**
Conversion of benzaldehyde to 3 -phenyl-prop-2- en - 1- oic acid is:–	**Perkin condensation**	**JCECE - 2005**

Method of preparation of Carboxylic acids

Hydrolysis of phenyl isocyanide forms–	**formic acid**	**JCECE - 2007 JIPMER-2008**
In the oxidation of $C_6H_5–CH_2–CH_3$ by $KMnO_4$ the product formed is:–	**$C_6H_5–COOH$**	**Manipal-2019**

JEAM SPY

Search on TG: @apna_pdf

@apna_pdf

Oxidation of cyclohexene in presence of acidic potassium permaganate leads to– **Adipic acid**	**TS EAMCET-2017**
In the reaction Phenol $\xrightarrow{NaOH}(A)\xrightarrow[140^{\circ}C]{CO_2+HCl}(B)$, here B is – **salicylic acid**	**(AIIMS-2017)**
The chromyl chloride is dissolved in water we get– **chromic acid**	**COMEDK 2017**
The fatty acid which shows reducing property is– **formic acid**	**VITEEE- 2010**
Phenol on heating with CCl_4 and alcoholic KOH, gives salicylic acid. This reaction is– **Riemann-Tiemann reaction**	**MPPET-2008**
Urea upon hydrolysis yields:– **carbonic acid**	**(AIIMS-2010)**
Benzoic acid is treated with lithium aluminium hydride. The compound obtained is– **benzyl alcohol**	**(AIIMS-2007)**
Formic acid can be distinguished from acetic acid by reaction with– **dil, acidified $KMnO_4$ solution**	**AMU-2011**
Cyanide group on hydrolysis gives :– **acid**	**BCECE-2005**
Formic acid and acetic acid can be distinguished by:– **Tollen's reagent**	**UP CPMT-2012 [BITSAT-2010]**
Acetic acid dissolved in benzene shows molecular weight– **120**	**CG PET -2007**
The acid which contains the aldehyde group is:– **formic acid**	**UPTU/UPSEE-2006**

Physical and Chemical Properties

Identify the compound 'C' from following reaction. $CH_3COOH\xrightarrow[\Delta]{NH_3}A\xrightarrow{Br_2+NaOH}B\xrightarrow[HCl]{NaNO_2}C-$ **CH_3OH**	**GUJCET-2022**
By passing the vapour of acetic acid over heated MnO at 300° C we obtain– **Acetone**	**Assam CEE-2021**
Identify (Z) in the following raction: $CH_3COOH\xrightarrow{LiAlH_4}(X)\xrightarrow[573K]{Cu}(y)\xrightarrow{dil.NaOH}(Z)-$ **Aldol**	**AP EAPCET 20.08.2021 Shift-I**
Benzoyl chloride is prepared from benzoic acid by– **$SOCl_2$**	**TS EAMCET 10.08.2021, Shift-II**
The reagent that distinguishes formic acid and acetic acid is :– **$HgCl_2$**	**Manipal-2020 CG PET- 2015**
By passing the vapour of acetic acid over heated MnO at 300°C we obtain– **Acetone**	**Assam CEE-2019**
The main constituent of vinegar is .....– **acetic acid**	**AP EAMCET (Engg.) 18.09.2020, Shift-I**
For conversion of a carboxylic acid chloride, $SOCl_2$ is preferred over PCl_3, because– **the by products are volatile**	**Assam CEE-2019**
Acetic acid is distilled with P_2O_5, a strong dehydrating agent to get– **acetic anhydride**	**JCECE - 2018**
The reagent that can reduce the carboxylic acid group to the corresponding alcohol is– **B_2H_6/H_3O^+**	**TS-EAMCET-18.07.2022, Shift-I**
Phenol and benzoic acid may be distinguished by– **$NaHCO_3$**	**UP CPMT-2005**
Calcium Acetate on heating under distillation gives– **Acetone and Calcium Carbonate**	**VITEEE- 2006**
Self condensation of two moles of ethyl acetate in presence of sodium ethoxide yields– **acetoacetic ester**	**(AIPMT -2006)**
Vinegar is dilute aqueous solution of– **Ethanoic acid**	**HP CET-2018 Manipal-2017**

Search on TG: @apna_pdf

@apna_pdf

Name of the end product in the following series of reactions. $CH_3COOH \xrightarrow{NH_3} A \xrightarrow{\Delta} B \xrightarrow{P_2O_5} C$ **–Acetonitrile**	**AMU-2018**
Glacial acetic acid is obtained by– **distilling vinegar.**	**COMEDK 2018**
Formic acid reacts with PCl_5 to form :– **carbon monoxide and hydrogen chloride**	**Manipal-2017**
Benzoic acid with $Ba(OH)_2$ gives– **benzene**	**COMEDK 2017**
The major product of nitration of benzoic acid is– **3-nitrobenzoic acid**	**AMU-2017**
The reaction of methyltrichloroacetate (Cl_3CCO_2Me) with sodium methoxide (NaOMe) generate– **carbene**	**WB-JEE-2015**
Acetylation of salicylic acid yields– **Aspirin**	**SCRA-2015**
On heating a mixture of sodium benzoate and sodalime, product is formed– **Benzene**	**MPPET- 2009**
Oxalic acid is heated with conc. H_2SO_4, gives– **CO and CO_2**	**S. C. R. A - 2014**
The acetic acid is heated with P_2O_5 the compound formed will be:– **$(CH_3CO)_2O$**	**[BITSAT-2007]**
2-acetoxy benzoic acid is– **Aspirin (analgesic)**	**CG PET- 2012**
The compound formed as a result of oxidation of ethyl benzene by $KMnO_4$ is–**benz**	**(AIEEE 2007)**
Decarboxylation of malonic acid gives– **CH_3COOH**	**MHT CET-2011**
Silver salt of carboxylic acid on reaction with R–X gives– **ester**	**MHT CET-2009**
Sour taste of lemon is due to the presence of:– **citric acid**	**UPTU/UPSEE-2006**
Vinegar is a solution of acetic acid which is:– **6-8%**	**UPTU/UPSEE-2006**
The property that distinguishes formic acid from acetic acid is– **only formic acid reduces Fehling's solution**	**UPTU/UPSEE-2008**
The substance gives an effervescence of CO_2 with baking soda and reduce Tollen's reagent to give silver mirror. The substance is – **formic acid**	**BCECE-2018**
The major product obtained on interaction of phenol with sodium hydroxide and carbon dioxide is– **salicylic acid**	**BCECE-2018**
Propionic acid is treated with aqueous $NaHCO_3$,CO_2 is liberated. The 'C' of CO_2 comes from– **bicarbonate**	**AMU-2011**
The molecule that undergo self oxidation and reduction (disproponation) reaction intramolecularly upon heating with concentrated alkali is– **Phthalic acid**	**TS EAMCET 10.08.2021, Shift-I**
Reaction of acids with alcohols is also known as– **esterification reaction**	**MHT CET-2007**
Corrosive sublimate ($HgCl_2$) can be used to distinguish between– **formic acid and acetic acid**	**MHT CET-2007**
Essential compound to manufacture acrolein is– **glycerol**	**UP CPMT-2005**
Trans esterification is the process of– **conversion of one ester to another ester**	**VITEEE- 2007**
The alkaline hydrolysis of ester is known as– **Saponification**	**MHT CET-2012**
Reaction of ethyl formate with an excess of CH_3MgI followed by hydrolysis gives– **isopropyl alcohol**	**JIPMER-2008** **JCECE - 2007**
Calcium acetate, on heating, gives:– **acetone**	**AIIMS 26 May 2019 (Evening)**
Acetic acid is treated with $Ca(OH)_2$ and the product so obtained is subjected to dry distillation. The final product is– **propanone**	**Karnataka-CET-2015**
The end product of $CH_3COOH \xrightarrow{CaCO_3} A \xrightarrow{Heat} B \xrightarrow{NH_2OH} C$ – **acetoxime**	**JCECE - 2014**
$C_6H_5COOH \xrightarrow[(ii)\,\Delta]{(i)\,NH_3} P \xrightarrow{NaOBr} Q \xrightarrow[(ii)\,Heat\ to\ 460\,K]{(i)\,Conc.H_2SO_4} R$ 'R' is– **sulphanilic acid**	**Karnataka-CET-2014**

TEAMSPY

Search on TG: @apna_pdf

@apna_pdf

26. Amines

Structures of amines, Classification and Nomenclature

- The correct IUPAC name for $CH_2 = CHCH_2NHCH_3$ is– **N-methylprop-2-en-1-amine**
- Nitrogen atom of amino group is ..... hybridised– **sp^3**
- The shape of $(CH_3)_3N$ is pyramidal because– **Nitrogen forms three sp^3 hybridised sigma bonds with carbon atoms of methyl groups and there is one non-bonding electron pair**
- IUPAC name of the compound $(CH_3)_2NCH_3$ is– **N,N-dimethylmethanamine**
- The IUPAC name of isopropylamine is– **Propan-2-amine**
- 3^0 amine is– **Triethylamine**
- The structural formula of N-methyl aminomethane is– **$(CH_3)_2NH$**
- Bond angle present in trimethylamine is– **108^0**
- Type of isomers is–

$CH_3-CH_2-CH_2-CH_2-NH_2$ (A) & $H_3C-\underset{\underset{H}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2-NH_2$ (B)

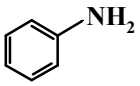
Chain isomer

Preparation of amines

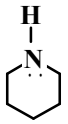
- The reagent that will convert acetamide to ethanamine is– **Lithium aluminium hydride**
- Aniline can be obtained by reduction of nitrobenzene with– **Fe/HCl, Sn/HCl, Electrolytic reduction under weakly acidic conditions**
- $RCONH_2+NaOH+Br_2 \rightarrow RNH_2+2NaBr+Na_2CO_3+2H_2O$.
  Reaction is said– **Hofmann bromamide reaction**

Physical properties

- The correct order of the basic strength of methyl substituted amines in queous solution is– **$(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N$**
- The strongest base in aqueous medium is– **$(CH_3)_2NH$**
- 3^0 amine is a– **Triethylamine**
- Tertiary amines have lowest boiling points amongst isomeric amines because– **They do not form hydrogen bonds**
- The correct order of boiling points of the isomeric amines is– **$C_4H_9NH_2 > (C_2H_5)_2NH > C_2H_5N(CH_3)_2$**
- The decreasing order of boiling points of isomeric amines is p-amine > s-amine > t-amine. This trend of boiling point can be explained as– **Intermolecular hydrogen bonding is maximum in primary amines & absent in tertiary amines**
- Highest pK_b value is– **NH_3**
- The strongest base in aqucous medium is– **$(CH_3)_2NH$**
- The weakest Bronsted base is–



- In order to prepare a 1^0 amine from an alkyl halide with simultaneous addition of one CH_2 group in the carbon chain, the reagent used as source of nitrogen is– **Potassium cyanide, KCN**
- Strongest base is–

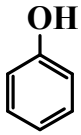


- Increasing pK_b values of o–, m– and p-toluidines is– **p < m < o**
- NH_2-group in aniline is– **o, p-directing and activating**
- The correct order of basic strength in benzene solution is– **R–COOH>RCH_2OH>RCH_2NH_2**
- Tertiary amines have lowest boiling points amongst isomeric amines because– **They do not form hydrogen bonds**

Search on TG: @apna_pdf
@apna_pdf

- Amines are basic in character because they have– **A lone pair of electrons on the nitrogen atom**
- ..... is most basic– **Benzylamine**
- Aliphatic amines are more basic than NH_3 but aromatic amines are _____ basic than NH_3– **Less**
- The strongest base in aqueous medium is– **$(CH_3)_2NH$**
- The ..... is the least basic– **$(C_6H_5)_3N$**
- $CH_3CH_2NH_2$ is more basic than CH_3CONH_2 because– **In $CH_3CH_2NH_2$ there is no resonance, while in acetamide the lone pair of electron on N-atom is delocalised and therefore less available for protonation**
- Amines are highly soluble in– **Water**
- Tautomerism is shown by– **$CH_3 - CH_2 - NO_2$**
- Nitration of aniline in strong acidic medium also given m-nitroaniline because– **In acidic (strong) medium aniline is present as anilinium ion**
- ..... will be most stable diazonium salt $RN_2^+X^-$ **$C_6H_5N_+^2X^-$**
- ..... is more basic than aniline– **Benzylamine**
- ..... is most basic in a solution of carbon tetrachloride– **$(CH_3CH_2)_3N$**
- Maximum pK_b value is of–

- The most basic compound is– **Benzylamine**
- Presence of a nitro group in a benzene ring– **Deactivates the ring towards electrophilic substitution**
- The weakest Bronsted base is–



Chemical Properties

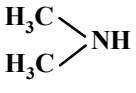
- On heating an aliphatic primary amine with chloroform and ethanolic potassium hydroxide, the organic compound formed is– **an alkyl isocyanide**
- The basic strength of amines in aqueous solution, the smallest pK_b value is– **$(CH_3)_2NH$**
- In order to prepare a 1^0 amine from an alkyl halide with simultaneous addition of one CH_2 group in the carbon chain, the reagent used as source of nitrogen is– **Potassium cyanide, KCN**
- The source of nitrogen in Gabriel synthesis of amines is– **Potassium phthalimide, $C_6H_4(CO)_2N^-K^+$**
- The best reagent for converting 2-Phenylpropanamide into 2-phenylpropapanamine is– **$LiAlH_4$ in ether**
- The best reagent for converting, 2-phenylpropanamide into 1-phenylethanamine is– **$NaOH/Br_2$**
- Methylamine reacts with HNO_2 to form– **CH_3OH**
- The gas evolved when methylamine reacts with nitrous acid is– **N_2**
- In the nitration of benzene using a mixture of conc. H_2SO_4 and conc. HNO_3, the species initiates the reaction is– **$\overset{+}{N}O_2$**
- Reduction of aromatic nitro compounds using Fe and HCl gives– **Aromatic primary amine**
- Acid anhydrides on reaction with primary amines give– **Amide**
- Best method for preparing primary amines from alkyl halides without changing the number of carbon atoms in the chain is– **Gabriel phthalimide synthesis**
- The amines that can be prepared by Gabriel phthalimide reaction is– **n-Butylamine**
- Ethylamine ($C_2H_5NH_2$) that can be obtained from N-ethylphthalimide on treatment with– **NH_2NH_2**
- Isocyanide on reaction with $CHCl_3$ and KOH will form– **$CH_3C_6H_4NH_2$**
- The amines are basic in nature, hence they form salts with hydrochloric acid. Insoluble in dil. HCl will be– **$(C_6H_5)_3N$**
- Basic strength of diflerent alkyl amines depends upon– **+I effect, steric effect, solvation effect**
- Amphoteric in nature is– **CH_3CONH_2**
- Primary amines react with benzoyl chloride to give– **Benzamides**
- When benzoyl chloride reacts with aniline in the presence of sodium hydroxide, would be obtained– **Benzanilide**
- Acetylation of a secondary amine in alkaline medium yields– **N,N-dialkylacetamide**
- Primary amines react with acid chloride or acid anhydride to form– **Substituted amides**
- The species that are involved in the carbylamine test is– **RNC, $CHCl_3$**
- Primary and secondary amines are distinguished by– **HNO_2**
- Cyclohexylamine is stronger base than aniline because– **In aniline electron pair is involved in conjugation**
- The action of nitrous acid on an aliphatic primary amine gives– **Alcohol**
- The compounds reacts with $NaNO_2$ and HCl at 0-4^0C to give alcohol/phenol is– **$C_2H_5NH_2$**

TEAM SKY

Search on TG: @apna_pdf

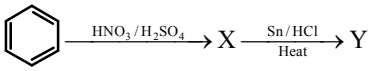
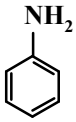
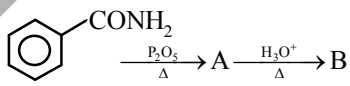
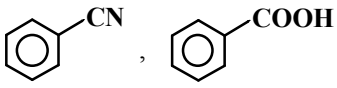
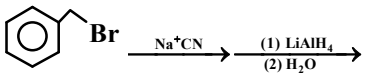
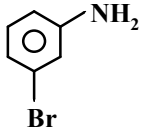
@apna_pdf

- The end product Z of the reaction :
  Ethyl amine $\xrightarrow{HNO_2}$ X $\xrightarrow{PCl_5}$ Y $\xrightarrow{KCN}$ Z is–
  Propanenitrile
- Reduction of nitrobenzene in presence of Zn/NH_4Cl gives– **Phenyl hydroxylamine**
- An organic compound (X) was treated with sodium nitrite and HCl in ice cold conditions. Bubbles of nitrogen gas were seen coming out. The compound (X) may be– **A primary aliphatic amine**
- Hinsberg's reagent is used as– **$C_6H_5SO_2Cl$**
- Electrophilic substitution of aniline with bromine water at room temperature gives–
  2, 4, 6-tribromoaniline
- A compound (X) with molecular formula C_3H_9N reacts with $C_6H_5SO_2Cl$ to give a solid which is insoluble in alkali (X) is– **$CH_3 – NH – CH_2CH_3$**
- Primary, secondary and tertiary amines may be separated by using– **Benzenesulphonyl chloride**
- The reaction of benzenesulphonyl chloride with ethylamine yields–
  N-ethylbenzenesulphonamide, soluble in alkali
- For nitration of aniline, the steps is followed–
  Acetylation followed by nitration and hydrolysis
- The amines that can be directly oxidised to the corresponding nitro compound by potassium permanganate is– **$(CH_3)_3CNH_2$**
- Secondary amines could be prepared by–
  Reduction of isonitrile
- Amino group is o, p-directing for electrophilic substitution reaction. But, on nitration the major product is m-nitroaniline because–
  Aniline gets protonated with strong acids to give anilinium ion which is m-directing
- Oxidation of aniline with manganese dioxide and sulphuric acid produces– **p-benzoquinone**
- When aniline is heated with conc. H_2SO_4 at 455 – 475K, it forms– **Sulphanilic acid**
- Reduction of aromatic nitro compounds using Sn and HCl gives– **Aromatic primary amines**
- When excess of ethyl iodide is treated with ammonia, the product is–
  Tetraethylammonium iodide
- Secondary amines can be prepared by–
  Reduction of isonitriles
- Reduction of CH_3CH_2NC with hydrogen in presence of Ni or Pt as catalyst gives– **$CH_3CH_2NHCH_3$**
- Amides can be converted into amines by a reaction named after– **Hoffmann**
- The most convenient method to prepare an amine containing one carbon atom less is–
  Hoffmann bromamide reaction
- The amides that will give ethylamine on reaction with sodium hypobromide is– **Propanamide**
- A mixture of 1°, 2° and 3° amines can be separated by Hinsberg's reagent which is– **Benzene sulphonyl chloride**
- Benzylamine and aniline can be distinguish by–
  Br_2 water
- The compound obtained by heating a mixture of a primary amine and chloroform with ethanolic potassium hydroxide is– **An alkyl isocyanide**
- A compound X has the molecular formula C_7H_7NO. On treatment with Br_2 and KOH, X gives an amine Y. the latter gives carbylamine test. Y upon diazotisation and coupling with phenol gives an azo dye. Thus X is– **$C_6H_5CONH_2$**
- Bromine water reacts with aniline to give–
  2, 4, 6-Tribromoaniline
- 2, 4, 6-tribromo aniline is a product of–
  Electrophilic substitution on $C_6H_5NH_2$
- ..... compounds gives dry test– **Aniline**
- ..... forms a stable diazonium salt at 273 – 278 K–
  Aniline
- Reaction of nitrous acid with aliphatic primary amine in the cold gives– **An alcohol**
- The gas evolved when methylamine reacts with nitrous acid is– **N_2**
- The source of nitrogen in Gabriel synthesis of amines is–
  Potassium phthalimide $C_6H_4(CO)_2\ N^-K^+$
- The most appropriate for preparing 2^0 amine is–
  1^0 $R–NH_2$ + RCHO followed by H_2/Pt
- The best reagent for converting 2-Phenylpropanamide into 2-Phenylpropanamine is–
  $LiAlH_4$ in ether
- The best reagent for converting, 2-Phenylpropanamide into 1-Phenylethanamine is–
  $NaOH/Br_2$
- Hoffman bromamide degradation reaction is shown by– **$ArCONH_2$**
- Methylamine reacts with HNO_2 to form– **CH_3OH**
- The gas evolved when methylamine reacts with nitrous acid is– **N_2**
- In the nitration of benzene using a mixture of conc. H_2SO_4 and conc. HNO_3, the species which initiates the reaction is– **NO_2^+**
- Reduction of aromatic nitro compounds using Fe and HCl gives– **Aromatic primary amine**
- The most reactive amine towards dilute hydrochloric acid is–



Search on TG: @apna_pdf

@apna_pdf

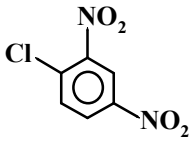
- Acid anhydride on reaction with primary amines give– **Amide**
- The reaction $Ar\overset{+}{N}_2Cl^- \xrightarrow{Cu/HCl} ArCl+N_2+CuCl$ is named as– **Gattermann reaction**
- Best method for preparing primary amines from alkyl halides without changing the number of carbon atoms in the chain is– **Gabriel phthalimide synthesis**
- Reaction of propanamide with ethanolic sodium hydroxide and bromine will give– **Ethylamine**
- Nitration of aniline in strong acidic medium also gives m-nitroaniline because– **In acidic (strong) medium, aniline is present as anilinium ion.**
- The compound having the molecular formula C_3H_9N can represent– **Trimethylamine, n-propylamine and Isopropylamine**
- A secondary amine is– **A compound in which two of the hydrogens of NH_3 have been replaced by alkyl or aryl groups**
- Best method for preparing primary amines from alkyl halides without changing the number of carbon atoms in the chain is– **Gabriel phtalimide synthesis**
- Gabriel phthalimide reaction is used for the preparation of– **Aliphatic primary amines**
- When acetamide is treated with Br_2 and caustic soda, then we get– **Methylamine**
- A compound 'A' when treated with HNO_3 (in presence of H_2SO_4) gives compound B, which is then reduced with Sn and HCl to aniline. The compound is– **Benzene**
- Aniline on reaction with acetyl chloride gives– **Acetanilde**
- An organic compound (A) on reduction gave a compound (B). Upon treatment with HNO_2, (B) gave ethyl alcohol and on warming with $CHCl_3$, and alcoholic KOH, (B) gave an offensive smell. The compound (A) is– **CH_3CN**
- An amine reacts with $C_6H_5SO_2Cl$ and the product is soluble in alkali, amine is– **1° amine**
- On reduction with lithium aluminium hydride yields a secondary amine– **Methyl isocyanide**
- The reaction of the benzyl chloride with sodium cyanide followed by reduction with hydrogen in the presence of nickel gives– **β-phenyl ethylamine**
- When methyl iodide treated with ammonia, the product obtained is– **Methyl amine, Dimethyl amine and Trimethyl amine**
- C_7H_9N has ..... isomers forms that contain a benzene ring– **5**
- ..... is appropriate for converting acetamide to methanamine– **Stephens reaction**
- Electrolytic reduction of Nitrobenzene in weakly acidic medium gives– **N-phenylhydroxylamine**
- In the chemical reaction.
  $CH_3CH_2NH_2+CHCl_3+3KOH \longrightarrow (A)+(B)+3H_2O$
  The compounds (A) and (B) are respectively– **C_2H_5NC and 3KCl**
- When benzamide is heated with thionyl chloride, the main product of the reaction is– **C_6H_5CN**
- 
  The final product 'Y' is– 
- In the reaction
  $CH_3CN + 2H \xrightarrow[SnCl_2]{HCl} X \xrightarrow{\text{Boiling } H_2O} Y,$
  – Acetaldehyde
- $CH_3CH_2NH_2$ is soluble in– **Dilute HCl, H_2SO_4, $CuSO_4$**
- The reagent nitrobenzene to aniline is– **Sn/HCl**
- 
  The compound A and B are– 
- $CH_3CH_2NH_2 \xrightarrow[\Delta]{(CH_3CO)_2O} A+B.$(A) and (B) are : **$CH_3CH_2NHCOCH_3+CH_3COOH$**
- 2, 4, 6-tribromo aniline is a product of– **Electrophilic substitution on $C_6H_5NH_2$**
- The least likely to synthesise benzylamine is– 
- The most basic in aqueous solution is– **$(CH_3)_2NH$**
- In a set of reactions m-bromobenzoic acid gave a product D. Product D is– 
- Hydrazobenzene on treatement with H_2SO_4 forms– **Benzidine**
- The structures that is represents benzanilide– **$C_6H_5NHCOC_6H_5$**

TEAM SPY

Search on TG: @apna_pdf

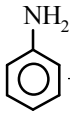
@apna_pdf

- The compounds that will give aromatic nucleophilic substitution reaction–

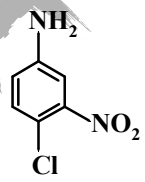


- Mustard oil reaction is– **Primary amines**
- Acetoxime on reduction with Na/C_2H_5OH would give– **Isopropylamine**
- $C_2H_5Br \xrightarrow{AgCN} A \xrightarrow{H_3O^+} HCOOH + B$;

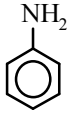
  $B \xrightarrow[KOH]{CHCl_3} A \xrightarrow{Reduction} C$

  A,B,C respectively in the above sequence are– **Ethyl isocyanide, ethaneamine and ethylmethylamine**
- Ethylamine reacts with nitrosyl chloride (NOCl) to form– **Ethyl chloride**
- An organic compound with M.F. C_3H_5N on hydrolysis forms an acid which reduces Fehling's solution. The compound can be– **Ethyl carbylamine**
-  $\xrightarrow{(CH_3CO)_2O} X \xrightarrow{Br_2/CCl_4} Y \xrightarrow{H_2O/H^+} Z$

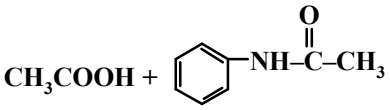
  'Z' is– **p-Bromo aniline**
- If meta-nitroaniline is chlorinated, the major product is–



- In the reaction sequence

 $\xrightarrow[0^0C]{NaNO_2/HCl} A \xrightarrow{CuCN} B \xrightarrow{LiAlH_4} C$

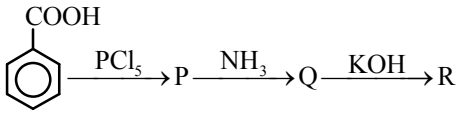
  The product 'C' is– **Benzyl amine**
- Aniline reacts with acetaldehyde to form– **Schiff's base**
- The strongest base in a queous solution is– **N-ethylethanamine**
- Obtained on acetylation of aniline will be– **N-acetylamino benzene**
- The species that are involved in carbylamine test is– **RNC, $CHCl_3$**
- For carbylamine reaction, we need hot alcoholic KOH and– **Any primary amine and chloroform**
- Basic strength of different alkyl amines depends upon– **+1 effect, Steric effect, Solvation effect**
- Among the compounds : $C_3H_7NH_2$, CH_3NH_2,$C_2H_5NH_2$ and $C_6H_5NH_2$. The basic compound is– **$C_6H_3NH_2$**
- Aniline reacts with acetic anhydride to give–



- Reaction $CH_3CH_2NH_2 \xrightarrow{NaNO_2/HCl} X$. The product of the above reaction is– **CH_3CH_2OH**
- A positive carbylamine test is given by– **Isopropyl amine**
- $C_6H_5Cl \xrightarrow[Cu_2O,200^0C]{NH_3} X$; $X \xrightarrow[0-5^0C]{HNO} Z$; X+Z→A; the no. of α and π bonds in 'A' are– **27σ, 7π**
- Aniline when treated with benzoyl chloride, gives benzanilide, the reaction is known as– **Schotten baumann**
- Aniline and diphenylamine may be distinguished by– **Carbylamine reaction**
- The correct sequence of reaction to be performed to convert benzene into m-bromoaniline is– **Nitration, bromination, reduction**
- Amphoteric in nature is– **CH_3CONH_2**
- Zwitter ion can exist as– **Sulphanilic acid**
- $C_6H_5NH_2 \xrightarrow[273K]{NaNO_2+HCl} X \xrightarrow{CuCN} Y \xrightarrow[Boil]{H+/H_2O} Z$

  in this reaction, Z is– **C_6H_5COOH**
- $CH_3NH_2Cl \xrightarrow{NaCN} X \xrightarrow{Ni/H_2} Y \xrightarrow{Acetic\ anhydride} Z$,

  in this reaction, Z is– **$CH_3CH_2CH_2NHCOCH_3$** ■



  The end product in the reaction– **Aniline**
- The product formed when phthalimide is treated with a mixture of Br_2 and strong NaOH solution is– **Anthranilic acid or o-amino benzoic acid**
- Reaction $CH_3CONH_2 \xrightarrow{NaOBr}$ gives – **CH_3NH_2**
- The most convenient method to prepare an containing one carbon atom less is– **Hofmann bromamide reaction**
- The amides that will give ethylamine on reaction with sodium hypobromide is– **Propanamide**
- The compounds from the primary amines under suitable reduction conditions is– **$C_2H_5CONH_2$, $C_2H_5NO_2$**
- Which product is formed, when acetonitrile is hydrolysed partially with cold concentrated HCl– **Acetamide**

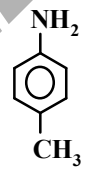
Search on TG: @apna_pdf

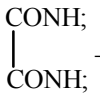
@apna_pdf

- The product formed by the reaction of an aldehyde with a primary amine is– **Schiff base**
- The electrolyte reduction of nitrobenzene in strongly acidic medium produces– **p-Aminophenol**
- Nitrobenzene on reaction with conc. HNO_3/H_2SO_4 at 80-100ºC forms with the product– **1, 3-Dinitrobenzene**
- The action of nitrous acid on an aliphatic primary amine, gives– **Alcohol**
- The compound obtained by heating a mixture of ethyl amine and chloroform with ethanolic potassium hydroxide (KOH) is– **An amide and nitro compound**
- Nitrobenzene can be prepared from benzene by using a mixture of conc. HNO_3 and conc. H_2SO_4. In the mixture, nitric acid acts as a– **Base**
- ..... isomers of molecular formula C_3H_9N will liberate N_2 gas on treatment with HNO_2– **Two**
- Isocyanide is prepared by– **Carbylamine reaction**

Methods of preparation of diazonium salts

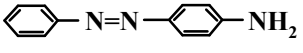
- $C_6H_6 \xrightarrow[H_2SO_4]{HNO_3} P \xrightarrow{Sn/HCl} Q \xrightarrow[HCl]{NaNO_2} P \xrightarrow[H_2O]{H_3PO_2} S.$ The end product S in the given sequence of reaction is– **Benzene**
- Compound [X] C_7H_9N reacts with $NaNO_2$/conc. HCl at 0^0C followed by β-naphthol to give orange coloured dye. Compound [X] will be–



- During preparation of arenediazonium salts, the excess of nitrous acid, if any, is destroyed by adding– **aq. NH_2CONH_2**
- Benzenediazonium chloride on treatment with water gives– **Phenol**
-  $\xrightarrow{Heat} X \xrightarrow{P_4O_{10},\Delta} Y$; Y is likely to be – **$C_2N_2$**
- Ethylamine and aniline can be distinguised by– **Azo Dye test**
- Phenol $\xrightarrow[distillation]{Zn} A \xrightarrow[conc.HNO_3(60^0C)]{conc.H_2SO_4} B \xrightarrow{Zn-NaOH} C$ **Benzene, nitrobenzene, hydrazobenzene**
- $C_6H_5CONH_2+HNO_2 \rightarrow A+B$; the products are– **Benzoic acid and nitrogen**

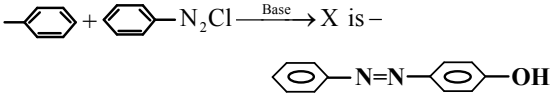
Chemical reaction

- During preparation of arenediazonium salts, the excess of nitrous acid, if any, is destroyed by adding– **aq. NH_2CONH_2**
- The property of benzenediazonium fluoroborate is– **It is water insoluble and stable at room temperature**
- Benzenediazonium chloride on reaction with phenol in weakly basic medium gives– **p-hydroxyazobenzene**
- The correct method to convert p-toluidine to p-toluic acid is– **Diazotisation, CuCN/KCN,H_2O/H^+**
- $C_6H_5NO_2 \xrightarrow{Sn/HCl} P \xrightarrow[HCl]{NaNO_2} Q \xrightarrow[\Delta]{HBF_4} R$ The end product R in the given sequence of reaction is– **Fluorobenzene**
- The coupling reaction of aryldiazonium chloride with aniline are carried out in– **mild acidic medium**
- The product 'D' in the sequence of reactions is $C_6H_5NH_2 \xrightarrow[(aq)]{Br_2} A \xrightarrow[HCl]{NaNO_2} B \xrightarrow{HBF_4} C \xrightarrow{Heat} D$ **2, 4, 6-tribromofluorobenzene**
- In diazotisation reaction of aniline with $NaNO_2$ and HCl, an excess of HCl is used to– **Suppress the concentration of free aniline available for coupling**
- Diazo-coupling is useful to prepare some– **Dyes**
- Benzenediazonium chloride on reaction with water gives– **Phenol**
- Benzenediazonium chloride on reaction with phenol in weakly basic medium gives– **p-Hydroxyazobenzene**
- When benzenediazonium chloride is heated with fluoro boric acid, flurobenzene is formed. This reaction is called– **Balz Schiemann reaction**
- Benzenediazonium chloride is reduced to benzene by– **Hypophosphorous acid**
- Diazotisation can be carried out by the action of $NaNO_2$ and dilute HCl on at ice cold temperature– **Aromatic primary amine**
- When benzene diazonium chloride is treated cuprous chloride and HCl the product formed is– **Chlorobenzene**
- Benzenediazonium chloride is reduced to benzene by– **Hypophosphorous acid**
- The reactions are suitable method for the preparation of primary amines is– **Hofmann Bromamide reaction, Gabriel's phthalimide synthesis of amines**
- When aniline is treated with benzene diazonium chloride at low temperature in weakly acidic medium, the final product obtained is–



TEAM SPY
Search on TG: @apna_pdf
@apna_pdf

- $CH_3NO_2 \xrightarrow[\text{Excess}]{Cl_2/NaOH} X$

  The compound 'X' is– **Cl_3CNO_2**
- $CH_3CH_2–CH_2NH_2$ with chloroform and KOH (alc.) forms– **$CH_3CH_2CH_2–NC$**
- Fluorobenzene can be synthesised in the laboratory– **From aniline by diazotisation followed by heating the diazonium salt with HBF_4**
- The diazonium salt is most stable– **p-Methoxybenzenediazonium chloride**
-  is –

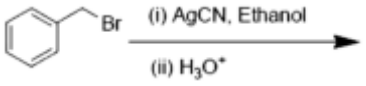
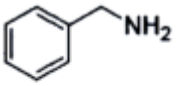
- Benzenediazonium chloride reacts with phenol to give p-hydroxy azobenzene, an orange dye. This reaction is known as– **Coupling reaction**

EXAM POINT

Structure of Amines, Classification and Nomenclature

Nitrobenzene on reduction using zinc in alkaline medium results in X. The number of sigma (σ) and pi (π) bonds in X is– **27σ, 6π**	**AP-EAMCET- (Engg.)-2011**
Presence of a nitro group in a benzene ring:– **Deactivates the ring towards electrophilic substitution**	**[AIEEE 2007]**
The basic character of ethyl amine, diethyl amine and triethyl amine in chlorobenzene is:– **$C_2H_5NH_2 < (C_2H_5)_2NH < (C_2H_5)_3N$**	**AIIMS-2011**
Benzamide and benzyl amine can be distinguished by– **Cold dil. HCl**	**AIIMS-2011**
N-ethyl-N-methylpropan-1-amine is– **3° amine**	**MHT CET-2010**
Iso-propyl amine is a– **primary amine**	**MHT CET-2009**
Name of method use to separate primary, secondary and tertiary amines is.– **Hoffmann method**	**UPTU/UPSEE-2009**
Diethyl oxalate is used for distinguishing primary, secondary and tertiary– **amines**	**AIIMS-2009**
During, acetylation of amines, the group that is replaced by acetyl group is– **One or more hydrogen atoms attached to nitrogen atom**	**JIPMER-2009 UP CPMT-2008**

Preparation of Amines

Nitrobenzene on reaction with phosphinic acid (H_3PO_2) at some elevated temperature produces– **p-aminophenol**	**Tripura JEE-2019**
Nitrobenzene is reduced by Zn and alcoholic potash mixture to get– **$C_6H_5—NH—NH—C_6H_5$**	**AP - EAMCET (Medical) - 2007**
Hydrolysis of the minor product formed from the reaction of 1-Bromo propane and ethanolic KCN given.–	**AP-EAMCET-07.07.2022, Shift-II**
The major product from the reaction sequence  	**AP-EAPCET-12.07.2022, Shift-I**
Gabriel's synthesis used frequently for the preparation of– **Primary amines**	**COMEDK-2015 JIPMER-2010 MPPET-2008**
Nitrobenzene on treatment with zinc dust and aqueous ammonium chloride gives:– **C_6H_5NHOH**	**BCECE-2007 AIIMS-2006**
An amine on reaction with benzene sulphonyl chloride produces a compound insoluble in alkaline solution. This amine can be prepared by ammonolysis of ethyl chloride. The correct structure of amine is– **$CH_3CH_2CH_2NH – CH_2CH_3$**	**JEE Main 2021, 26 Feb Shift-I**
2°- Amine is obtained by reduction of– **Isonitrile compound**	**GUJCET-2021**

Search on TG: @apna_pdf

@apna_pdf

The amines that undergo carbylamines reaction are– **l^o – aliphatic amines, l^o – aromatic amines**	**TS-EAMCET 09.08.2021, Shift-I**
The best reagent for converting 2-Phenyl propanamide into 1-Phenyl ethanamine is _____.– **$NaOH/Br_2$**	**GUJCET-2020**
The most appropriate reagent for conversion of C_2H_5CN into $CH_3CH_2CH_2NH_2$ is– **$LiAlH_4$**	**JEE Main 2020, 5 Sep Shift-I**
Carbylamine reaction is shown by– **Primary amines**	**J & K CET-(2019)**
Ethylamine ($C_2H_5NH_2$) can be obtained from N-ethylphthalimide on treatment with– **NH_2NH_2**	**JEE Main 2019, 10 April Shift-I**
Acetanilide on nitration followed by alkaline hydrolysis mainly gives– **p-Nitroaniline**	**AIIMS 26 May 2019 (Evening)**
Conversion of alkyl halide (R-X) to a primary amine is carried out with the help of– **Gabriel pthalimide synthesis**	**Assam CEE-2019**
Hoffmann bromamide reaction is used to convert– **An amide to amine**	**COMEDK-2019 J & K CET-(2017)**
In the Hoffmann-bromamide degradation reaction, the number of moles of NaOH and Br_2 used per mole of amine produced are– **four moles of NaOH and one moles of Br_2**	**JEE Main-2016**
Electrolytic reduction of nitrobenzene in weakly acidic medium gives– **aniline**	**AIPMT -2005**
The electrolytic reduction of nitrobenzene in strongly acidic medium produces–**p-a**	**NEET-2015, Cancelled)**
Phenyl isocyanide is prepared from aniline by– **Carbylamine reaction**	**Kerala-CEE-2014**
In the reaction. $RCONH_2 \rightarrow RCN$ The reagent is– **NaOBr**	**UP CPMT-2014**
The reagent needed to convert $C_6H_5CONH_2$ to $C_6H_5 - NH - COCH_3$ is– **KOH/Br_2; CH_3COCl**	**Assam CEE-2014**
The major product formed when alkyl iodide is treated with excess of ammonia–**Pr**	**COMEDK-2014**
Positive carbylamines test is shown by– **p-methylbenzylamine**	**Kerala-CEE-2013**
The source of nitrogen in Gabriel synthesis of amines is– **potassium phthalimide $C_6H_4(CO)_2N^-K^+$**	**JCECE - 2013**
The compound that forms a yellow oily liquid with nitrous acid is–**diethyl amine**	**MHT CET-2009**
A secondary amine could be prepared readily form the starting material– **Alkyl isocyanide**	**J & K CET-(2009)**
An organic amino compound reacts with aqueous nitrous acid at low temperature to produce an oily nitro amine. The compound is– **$CH_3CH_2NHCH_2CH_3$**	**UPTU/UPSEE-2008**
Benzamide can be converted to benzonitrile with– **P_2O_5**	**J & K CET-(2008)**
The acetamide is treated with Br_2 and caustic soda, the product formed is– **methanamine**	**MHT CET-2008**
The compound that gives an oily nitrosoamine on reaction with nitrous acid at low temperature is– **$CH_3–NH–CH_3$**	**AIIMS-2008**
The end product (Y) in the reaction sequence $CH_3CONH_2 \xrightarrow[\Delta]{P_2O_5} X \xrightarrow{Sn/HCl} Y$ is– **ethanamine**	**AMU-2008**
Aniline is prepared in presence of Fe/HCl from– **nitrobenzene**	**BCECE-2008 UPCPMT - 2007**
Reduction of alkyl nitrites produces– **primary amine**	**J & K CET-(2007)**
Carbylamine reaction is given by aliphatic– **Primary amine**	**VITEEE- 2007**
Acetamide is reacted with NaOBr, then product formed is:– **methanamine**	**JCECE - 2006**
Compound [X] Molecular Formula C_7H_7NO reacts with Br_2- KOH to yield compound [Y] that gives mustard oil reaction. The structures of [X] and [Y] are–**b**	**CG PET -2019**

TEAM SKY

Search on TG: @apna_pdf

@apna_pdf

Physical Properties

Among methanamine, ethanamine, benzenamine, N-methylaniline and N, N-dimethylaniline, the weakest and the strongest base in aqueous phase, respectively are– **benzenamine and ethanamine**	**Kerala CEE -03.07.2022**
A secondary amine is– **a compound in which 2 of the hydrogen of NH_3 have been replaced by organic groups**	**Karnataka CET-17.06.2022, Shift-II**
Compound that has smell of bitter almonds is– **nitrobenzene**	**J & K CET-(2010)**
Tertiary amine is less basic than secondary amine because of– **steric effect**	**SRMJEEE – 2009**
Basic strength of amines is in the order of– **$(CH_3)_2NH > CH_3NH_2 > NH_3$**	**SRMJEEE – 2015, 2010**
The correct order of boiling points of isomeric amines is– **Primary amines > Secondary amines > Tertiary amines**	**JHARKHAND-2019**
Acetamide and ethylamine can be distinguished by reacting with– **aq. NaOH and heat**	**CG PET -2017**
C_3H_9N reacts with Hinsberg reagent and the product is insoluble in alkali but soluble in ether. This nitrogen containing compound is– **secondary amine**	**JIPMER-2016**
Correct order of basic nature is– **$CH_3NH_2 > NH_3 > C_6H_5NH_2$**	**COMEDK-2016**
One amine is more basic than ammonia and the other is less basic than ammonia. The two amines are respectively– **N- methyl ethanamine and N- dimethyl ethanamine**	**CG PET- 2013**
A solution of aniline in commercial chloroform kept for months started giving a pungent odour, this is due to the formation of– **Phenyl isocyanide**	**SCRA-2012**
The correct sequence of base strengths in aqueous solution is– **$(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N$**	**AMU-2014** **VITEEE- 2007**
The sequence of basic strength of alkyl amines is– **$RNH_2 < R_2NH > R_3N$**	**VITEEE- 2006**
Diethyl oxalate is used for distinguishing primary, secondary and tertiary– **amines**	**AMU-2005**

Chemical Properties

The product formed, when benzene diazonium fluoroborate is heated with aqueous sodium nitrite solution in the presence of copper is– **nitrobenzene**	**Kerala CEE -03.07.2022**
A primary aliphatic amine on reaction with nitrous acid in cold (273 K) and there after raising temperature of reaction mixture to room temperature (298 K), gives–**A**	**JEE Main-28.06.2022, Shift-I**
In carbylamine test for primary amines the resulting foul smelting product is– **CH_3NC**	**Karnataka CET-17.06.2022, Shift-II**
The reagents that converts nitrobenzene into N-phenyl hydroxylamine is– **Zn/NH_4Cl**	**AP-EAMCET-2007** **AP EAMCET (Engg.) -2007** **AIIMS-2003** **AP-EAMCET-1999** **AP EAMCET (Medical) -1998** **J & K CET-(1997)**
$C_6H_5N_2Cl$ in presence of KCN and CuCN gives an organic compound, that on acid hydrolysis gives 'X'. The compound 'X' may be– **benzoic acid**	**SRMJEEE – 2016**
$C_6H_5NH_2 + C_6H_5CHO \rightarrow C_6H_5N{=}CHC_6H_5$ involves– **addition/elimination**	**SRMJEEE – 2015**
Action of $NaNO_2$ with dilute HCl on $ArNH_2$ yields $ArN_2^+Cl^-$. A similar reaction with cyclohexylamine will yield– **cyclohexanol**	**SRMJEEE – 2014**

Search on TG: @apna_pdf

@apna_pdf

In the direct nitration of aniline by using HNO_3|H_2SO_4 at 288 K, a mixture of products is formed– **p-nitroaniline and o-nitroaniline are major products and m-nitroaniline is minor product**	**SCRA-2014**
The best reagent for converting 2-phenyl-propanamide into 2-phenylpropanamine is– **$LiAlH_4$ in ether**	**AMU-2013**
The product formed when phthalimide is treated with a mixture of Br_2 and strong NaOH solution is– **anthranilic acid**	**VITEEE- 2011**
The p-nitrobromobenzene reacts with sodium ethoxide, the product obtained is– **p-**	**VITEEE- 2010**
Nitration of nitrobenzene at 125^0C with mixed acids gives–**meta-dinitrobenzene**	**J & K CET-(2008)**
Activation of benzene ring in aniline can be decreased by treating with– **acetyl chloride**	**VITEEE- 2006**
The aniline is heated with conc. H_2SO_4 at 455 – 475 K, it forms– **sulphanilic acid**	**WB-JEE-2018, J & K CET-(1999)**
Primary, secondary and tertiary amines can be distinguished by– **Hinsberg test**	**J & K CET-2017, 1997**
The reagent that is used to distinguish between a secondary amine and a tertiary amine is– **p-toluenesulphonyl chloride**	**Kerala-CEE-2020**
A primary amine reacts with chloroform and ethanolic KOH then the product formed is– **Isocyanide**	**Assam CEE-2020**
Acetylation of a secondary amine in alkaline medium yields :– **N, N-dialkyl acetamide**	**Manipal-2019**
In acid medium nitrobenzene is reduced to aniline as shown in the reaction : $C_6H_5–NO_2+6[H] \rightarrow C_6H_5–NH_3+2H_2O$. The reducing agent used in this reaction is :– **Sn / HCl**	**Manipal-2019**
Nitration of aniline in strong acidic medium also gives m-nitroaniline because– **in acidic (strong) medium aniline is present as anilinium ion.**	**NEET-2018**
Aniline is used in the manufacture of drug like– **acetanilide**	**JCECE-2018**
The amine, that reacts with p-toluenesulphonyl chloride to give a clear solution, which on acidification gives insoluble compound is– **$C_2H_5NH_2$**	**MHT CET-2017**
The compound that would produce a nauseating smell/odour with a hot mixture of chloroform and ethanolic potassium hydroxide is– **$PhNH_2$**	**WB-JEE-2017**
Hydrolysis of aromatic amide gives– **acids**	**JCECE-2017**
Towards electrophilic substitution, the most reactive will be– **Aniline**	**COMEDK-2017**
The best reagent for converting 2-phenyl-propanamide into 2-phenylpropanamine is– **$LiAlH_4$ in ether.**	**COMEDK-2017**
The amine 'A' that is treated with nitrous acid gives yellow oily substance. The amine A is– **methylphenylamine**	**MHT CET-2016**
Diethyl amine is treated with nitrous acid yields– **N-nitroso diethyl amine**	**MHT CET-2015**
Acid anhydrides on reaction with primary amines gives– **amide**	**JCECE-2015**
A mixture of methylamine and dimethyl-amine is given to you. The reagents used to separate the components of the mixture are– **$C_6H_5SO_2Cl$ and KOH**	**COMEDK-2015**
The reaction of aniline with chloroform under alkaline conditions leads to the formation of– **phenylisonitrile**	**WB-JEE-2014**
The aniline is nitrated with nitrating mixture in ice cold condition, the major product obtained is– **p-nitroaniline**	**WB-JEE-2013**
Benzamide on reaction with $POCl_3$ gives– **phenyl nitrile**	**UP CPMT-2012**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

Nitration of aniline also gives m-nitroaniline in strong acidic medium because.– **in strong acidic medium, aniline present as anilinium ion**	**UP CPMT-2012**
Maximum number of molecules of methyl iodide that can react with one molecule of methylamine is– **3**	**COMEDK-2012**
In the preparation of chlorobenzene from aniline, the most suitable reagent is– **nitrous acid followed by heating with Cu_2Cl_2**	**AMU-2009**
The reaction $R_2C=NNH_2 \xrightarrow{C_2H_2ONa} R_2CH_2 + N_2$ is called– **Wolff-Kishner reduction**	**MPPET-2009**
On heating benzyl amine with chloroform and ethanolic KOH, product obtained is– **benzyl isocyanide**	**MHT CET-2008**
Alkyl cyanides undergo Stephen reduction to produce– **Aldehyde**	**VITEEE- 2008**
The acetamide is hydrolysed by boiling with acid, the product obtained is:– **Acetic acid**	**VITEEE- 2008**
The product formed when hydroxylamine condenses with a carbonyl compound is called– **oxime**	**Karnataka-CET-2007**
Isopropyl amine with excess of acetyl chloride will give– **$(CH_3)_2CHN(COCH_3)_2$**	**MHT CET-2007**
In the chemical reaction, $CH_3CH_2NH_2+CHCl_3+3KOH \rightarrow (A)+(B)+3H_2O$. the compounds (A) and (B) are respectively– **C_2H_5NC and 3KCl**	**AIEEE-2007**
Amides are formed by the reaction of acid chloride with– **NH_3**	**J & K CET-(2007)**
Ethylamine on a acetylation gives :– **N - ethyl acetamide**	**BCECE-2006**
Aniline with $CHCl_3$ and KOH on heating gives.– **Phenyl isocyanide**	**UP CPMT-2005**
Schiff's base is formed by the reaction of aldehyde with– **amine**	**AMU-2015**

Method of Preparation diazonium salts

Hydrolysis of compound will give carbolic acid–**Benzenediazonium chloride**	**JEE Main-26.07.2022, Shift-II**
The suitable reagent for the synthesis of bromobenzene from benzene diazonium salts?– **Cu_2Br_2, HBr**	**AP EAMCET (Engg.) 18.9.2020 Shift-I**
In the diazotization of aryl amine the use of nitrous acid is– **it is a source of electrophilic nitrosonium ion**	**AMU-2011**
Nitrobenzene can be converted into azobenzene by reduction with– **Zn/NaOH, CH_3OH**	**VITEEE- 2010**
Fluorobenzene (C_6H_5F) can be synthesized in the laboratory– **from aniline by diazotisation followed by heating the diazonium salt with HBF_4**	**AIEEE-2006**

Chemical reaction

Benzenediazonium chloride upon treatment with Zn/HCl produces– **aniline**	**Tripura JEE-2019**
The replacement of diazonium group by fluorine is known as– **Balz-Schiemann reaction**	**MHT CET-2015**
The reaction $RCOOH + N_3H \xrightarrow{Conc.\ H_2SO_4} RNH_2 + CO_2 + N_2$ called– **Schmidt reaction**	**MPPET-2008**
The aqueous solution of benzene diazoniumchloride is boiled, the product formed is– **C_6H_5OH**	**VITEEE- 2007**
The treatment of acylazide ($RCON_3$) with acidic or alkaline medium gives– **$R-NH_2$**	**VITEEE- 2006**

Search on TG: @apna_pdf

@apna_pdf

27. Biomolecules

Carbohydrates

- The sweetest sugar is a– **Fructose**
- Reducing sugar is a– **Lactose**
- Hydrolysis of sucrose gives– **α-D-(+)-Glucose and β-D-(–)-Fructose**
- The reactions of glucose that can be explained only by its cyclic structure– **Pentaacetate of glucose does not react with hydroxylamine**
- Glycosidic linkage between C1 or α-glucose and C2 of β-fructose is found in– **Sucrose**
- Animal starch is the other name of– **Glycogen**
- The glycosidic linkage involved in linking the glucose units in amylose part of starch is– **$C_1 - C_4$ α-linkage**
- The basic formula for starch is– **$(C_6H_{10}O_5)_n$**
- Starch is composed of two polysaccharides are– **Amylose and amylopectin**
- In cellulose, D-glucose units are joined by– **β-1, 4 glycosidic linkage**
- Carbohydrates are stored in human body as the polysaccharide– **Glycogen**
- Glucose reacts with Tollens' reagent to give a derivative of– **Monocarboxylic acid**
- The general formula of carbohydrates is– **$C_n(H_2O)_n$**
- The compounds that is found abundantly in nature is– **Cellulose**
- Cellulose is a– **Hexapolysaccharide, Pentapolysaccharide, Tripolysaccharide**
- Benedict's solution is used to identify– **Reducing sugars**
- The example of an aldopentose is– **D-Ribose**
- The treatment that will convert starch directly into glucose– **Heating with dilute H_2SO_4**
- Glucose $\xrightarrow{HCN}$ X $\xrightarrow{Hydrolysis}$ Y $\xrightarrow[Heat]{HI}$ Z
  Identify Z– **Heptanoic acid**
- On oxidation with a mild oxidising agent like Br_2/H_2O, the glucose is oxidised to– **Gluconic acid**
- During acetylation of glucose it needs x moles of acetic anhydride. The value of x would be– **5**
- The letter 'D' in carbohydrates signifies– **Configuration**
- The anomeric carbon in D(+) glucose is– **C-1 carbon**
- A diabetic person carries a packet of glucose with him always, because– **Glucose increases the blood sugar level almost instantaneously**
- The α- and β- forms of glucose are– **Anomers of glucose**
- Total number of C-atoms are there in a pyranose ring– **5**
- The naturally occurring carbohydrates, furanose ring is found in the– **Fructose unit of cane sugar**
- The hydrolysis products of lactose are– **Glucose + Galactose**
- Glycosidic linkage is an– **Ether linkage**
- Invert sugar is– **Mixture of glucose and fructose in equimolar quantities**
- Maltose is made up of– **Two α-D-glucose**
- Glucose reacts with HNO_3 to form– **Saccharic acid**
- The ..... is a reducing sugar– **Maltose**
- Carbohydrate is a condensation polymer of– **Simple sugars**
- On reaction with red P + HI, glucose forms– **n-hexane**
- In ..... form carbohydrate is stored inside the human body– **Glycogen**
- α-D (+) Glucose and β-D (+) Glucose are– **Anomers**
- The disaccharide consists only of glucose unit– **Maltose**
- The disaccharide in acidic medium is called invert sugar– **Sucrose**
- The ..... component in starch is water insoluble– **Amylopectin**
- Carbohydrate is known as animal starch– **Glycogen**
- Glucose when reacted with acetic anhydride forms– **Pentacetate**
- The most common disaccharide has molecular formula– **$C_{12}H_{22}O_{11}$**
- Mutarotation in aqueous solution is shown by– **Maltose**
- Branched chain structure is shown by– **Amylopectin**

TEAM SPY

Search on TG: @apna_pdf
@apna_pdf

- The two cyclic hemiacetal forms of glucose differing only in the configuration of the hydroxyl group at C-1 are called– **Anomers**
- Glucose reacts with HCN to give– **Cyanohydrin**
- Cellulose is soluble in– **Ammonical cupric hydroxide solution**
- Cane sugar on hydrolysis gives– **Fructose - Glucose**
- Glycosidic linkage is present in– **Carbohydrates**
- The reagent which may be used to distinguish between cane sugar and glucose solution is– **Fehling's solution**
- ..... pair is an example of anomers– **α-D-glucose and β-D-glucose**
- Glucose when oxidised with conc. HNO_3 then the product formed is– **$HOOC(CHOH)_4COOH$**
- The reagent which forms crystalline osazone derivative when reacted with glucose is– **Phenylhydrazine**
- Glucose on oxidation with Tollen's reagent and conc. HNO_3 produces respectively– **Gluconic acid and saccharic acid**
- The difference between amylose and amylopectin is– **Amylopectin have 1 → 4 α-linkage and 1 → 6 α-linkage**
- ..... is a non-reducing sugar– **Sucrose**
- The nature of glucose-glucose linkage in starch that makes its so susceptible to acid hydrolysis– **Starch is acetal**
- Glucose molecule reacts with X number of molecules of phenyl-hydrazine to yield osazone. The value of X is– **Three**
- ..... is the sweetest sugar– **Fructose**
- The ..... give positive Fehling solution test– **Glucose**
- Number of chiral carbons in β-D-(+) glucose is– **Four**
- Sets of monosaccharides forms sucrose– **–α-D-Glucopyranose and β-D glucose-fructofluranose**
- Fructose reduces Tollen's reagent due to– **Enolisation of fructose followed by conversion to aldehyde by base**
- Lactic acid on oxidation by alkaline $KMnO_4$ gives– **Pyruvic acid**
- The cell membranes are mainly composed of– **Phospholipids**
- The number of molecules of ATP produced in the lipid metabolism a molecule of palmitic acid is– **129**
- Phospholipids are esters of glycerol with– **Two carboxylic acid residues and one phosphate group**
- Glycosis is– **Oxidation of glucose to pyruvate**
- The enzyme which hydrolyses triglycerides to fatty acids and glycerol is called– **Lipase**
- Sucrose on hydrolysis gives– **α-D-Glucose + β-D-Fructose**
- Sucrose (cane sugar) is a disaccharide. One molecule of sucrose on hydrolysis gives– **1 molecule of glucose + 1 molecule of fructose**
- The sugars occurs in the urine of diabetics is– **Dextrose**
- Mutarotation involve– **Diastereomerisation**
- Methyl-α-D-glucoside & methyl-β-D-glucoside are– **Anomers**
- The term anomers of glucose refers to– **Isomers of glucose that differ in configuration at C - 1**
- D - Glucose shows mutarotation because– **It undergoes interconversion between it's α and β (+) Glucopyranose structures**
- The simplest carbohydrate is a– **Glucose**
- Hydrolysis of sucrose with dilute aqueous sulphuric acid yields– **1 : 1 D (+) – Glucose; D-(–) – fructose**
- The basic formula for starch is– **$(C_6H_{10}O_5)_n$**
- The glycosidic linkage involved in the glucose unit in amylose part of starch is– **$C_1 – C_4 – α$ – linkage**
- The correct statement about lactose– **It consists of one galactose and one glucose unit**
- Non-reducing sugar is a– **Sucrose**
- The carbohydrates would be most abundant in the diet of strict vegetarian is– **Cellulose**
- The reactions establish difference between glucose and fructose is– **Conc. HNO_3**
- The pair that will give positive test with tollen reagent is– **Glucose, fructose**
- Glucose + Tollen's reagent → silver mirror, the above process shows– **Presence of –CHO group**
- Starch is a polymer of– **Glucose**
- The linkages of Polysaccharides have– **Glycosidic linkages**
- A mixture of amylose and amylopectin is called– **Starch**
- The naturally occuring carbohydrates, furanose ring is found in the– **Fructose unit of cane sugar**
- The polymers is stored in the liver of animals is– **Glycogen**
- The intermediate compound formed in the conversion of starch to glucose is– **Maltose**
- Carbohydrates may be– **Sugars, Starch, Polyhydroxy aldehyde/ketones**
- The enantiomers of α – D – (+) – glucose is– **α – L – (–) – glucose**
- Aldose is a– **Glucose**

Search on TG: @apna_pdf

@apna_pdf

- Lactose on hydrolysis gives– **Equimolar mixture of galactose and glucose**
- Glucose on oxidation with nitric acid as well as gluconic acid both gives– **Saccharic acid**
- Reducing sugar is a– **Maltose, Glucose, Lactose**
- Specific rotation of equilibrium mixture of three forms of glucose is– **52.5^0**
- Molecular formula $C_6H_{12}O_6$ is of– **Glucose, Fructose**
- Molecular formula of pentahydroxy acid obtained when glucose is oxidised with Br_2 water is– **$C_6H_{12}O_7$**
- Amylopectin is– **Water insoluble**
- Maltose contains total number oxygen atoms– **11**
- A pyranose ring consists of skeleton of– **5 carbon atoms and one oxygen atoms**
- Glucose reacts with acetic anhydride to form– **Penta-acetate**
- The disaccharide present in milk is– **Lactose**
- The oligosaccharides is a– **Lactose, Sucrose**
- High content of starch is found in– **Roots, Cereals, Tubers**
- In aqueous solutions, amino acids mostly exist as– **$H_3N^+ - CHR - COO$**

Protiens

- The secondary structure of protein is stabilised by– **Hydrogen bonding**
- The structure of protein that is unaffected by heating is– **Primary structure**
- Basic amino acid is a– **Lysine**
- The amino acids that can be synthesised in the body is– **Alanine**
- The α-amino acid contains the aromatic side chain is– **Tyrosine**
- The number of amino acids required for protein synthesis is– **20**
- The basic amino acid is– **Lysine**
- Acidic amino acid is– **Glutamic acid**
- Amino acids generally exist in the form of zwitter ions. This means they contain– **Basic – COO^- group and acidic – NH_3 group**
- The compound that can exist in a dipolar (zwitterion) structure– **$(CH_3)_2CHCH(NH_2)COOH$**
- The melting points of amino acids are higher than the corresponding halo-acids because– **Amino acids exist as zwitter ions resulting in strong dipole - dipole attraction**
- Proteins are condensation polymers of– **α-amino acids**
- In fibrous proteins, polypeptide chains are held together by– **Hydrogen bonds**
- Keratin, a structural protein is present in– **Hair, Wool, Silk**
- Primary structure of a protein is– **Sequence in which α-amino acide are linked to one another**
- Secondary structure of protein refers to– **Folding patterns of polypeptide chain**
- Most common types of secondary structures of proteins are– **α-helix and β-pleated sheet structures**
- Denaturation of protein leads to loss of its biological activity by– **Loss of both secondary and tertiary structures**
- Enzymes are made up of– **Proteins with specific structure**
- The conversion of maltose into glucose is possible by the enzyme– **Maltase**
- Fat soluble vitamin is a– **Vitamin A**
- ..... is an essential amino acid– **Histidine**
- The ..... amino is optically inactive– **Glycine**
- The ..... is basic amino acid– **Lysine**
- Amino acids are known to be building blocks of– **Proteins**
- The number of amino acids required to form three peptide bonds are– **Four**
- A polypeptide on complete hydrolysis gives three amino acids. ..... sequence are possible for that polypeptide– **6**
- In a protein molecules, various amino acids are linked together by– **Peptide bond**
- The secondary structure of a protein refers to– **Regular folding patterns of contiguous protein of the polypeptide chain**
- A sequence of ..... nucleotides in messenger RNA makes a codon for an amino acid– **Three**
- During the process of digestion, the proteins present in food materials are hydrolysed to amino acids. The enzymes involved in the process Proteins → Amino acids, are respectively– **Pepsin and trypsin**
- Tertiary structures of proteins is given as– **Fibrous**
- Albumin is a type of– **Globular protein**
- Formation of 1° and secondary structures of proteins involves linkage– **Peptide linkage, H-bond**
- The ..... is a peptide hormone– **Glucagon**
- Rice is deficient in– **Lysine**
- Keratin in skin, hair, nails and wool is a– **Fibrous protein**
- ..... of protein mainly undergo denaturation– **Globular**
- Antibodies are– **Protein**
- The ..... compounds can form a zwitterion– **Glycine**

TEAMSPK

Search on TG: @apna_pdf

@apna_pdf

- ..... functional group participates in disulphide bond formation in proteins– **Thiol**
- Haemoglobin is– **A globular protein**
- The non-essential amino acid is– **Alanine**
- The compounds can form a zwitter ion– **Glycine**
- The difference between amylose and amylopectin is– **Amylopectin have 1 → 4α-linkage and 1→6 α-linkage**
- The reaction of glucose that can be explained only by its cyclic structure– **Pentaacetate of glucose does not react with hydroxyl amine**
- Each polypeptide in a protein has amino acids linked with each other in a specific sequence. This sequence of amino acids is said to be– **Primary structure of proteins**
- in aqueous solutions, amino acids mostly exist as– **$H_3N^+ - CHR - COO$**
- Messenger RNA makes a codon of total number of nucleotides for an amino acid– **Three**
- Characters are transferred from parents to offspring through– **DNA**
- Functionality of protein depends on– **Temperature, pH of medium, Its shape and structure**
- Globular proteins are present in– **Blood, Egg, Milk**
- Acidic amino acid is– **Glutamic acid**
- Keratin, a structural protein is present in– **Hair, Wool, Silk**
- α-helix refers to– **Secondary structure of protein**
- Most of the naturally occurring α - amino acids have– **L-configuration**
- More acidic is– **$H_3N^+CH_2COOH$**
- Essential amino acid is a– **Methionine**
- Protein is a polymer of– **Amino acid**
- Denaturation of proteins leads to loss of its biological activity by– **Loss of both secondary and tertiary structures**
- Proteins are condensation polymers of– **α - amino acids**
- The number of amino acids found in proteins that a human body can synthesise– **10**
- Most common types of secondary structures of protein are– **α-helix and β-pleated sheet structures**
- Protein found in biological system with definite configuration and biological activity is called– **Native protein**
- A zwitter ion is– **An ion with positive and negative charges at different point on it**
- In an alkaline medium, glycine predominantly exists as– **Anion**
- An example of a sulphur containing amino acid is– **Cysteine**
- Polypeptides having molecular weights above 10,000 are known as– **Proteins**
- The proteins which are insoluble in water are– **Fibrous proteins**
- On the basis of molecular structure, proteins is classified as– **Both fibrous & globular protein**
- Estradiol is responsible for the development of– **Secondary female characters**
- The reaction of enzymes in living system is to– **Enhance the rate of biochemical reaction**

Enzymes and Hormones

- The difference between amylose and amylopectin is– **Amylopectin have 1 → 4 α-linkage and 1 → 6 α-linkage**
- ..... is responsible for production of energy in bio reaction– **Thyroxine**
- The hormone that helps in the conversion of glucose to glycogen is– **Insulin**
- Enzymes in the living systems– **Catalyze biological reaction**
- By the action of enzymes, the rate of biochemical reaction– **Increases**
- Enzymes are made up of–**Protein with specific structure**
- The ..... hormones contains iodine– **Thyroxine**
- ..... is an amino hormone– **Thyroxin**
- The ..... hormones is produced under the condition of stress which stimulate : glycogenolysis in the liver of human beings– **Adrenaline**
- A mixture of α-amino acids is obtained when proteins are hydrolysed by– **Acids, Bases, Enzymes**
- A peptide hormone is– **Insulin**
- Enzymes are made up of– **Protein with specific structure**

Vitamins

- The RBC deficiency is deficiency disease of– **Vitamin B_{12}**
- Water soluble vitamin, that is not excreted easily– **Vitamin B_{12}**
- The B-group vitamins that can be stored in our body– **Vitamin B_{12}**
- Vitamin B_2, a water soluble vitamin is also known as– **Riboflavin**
- The vitamins that is water soluble– **Riboflavin**
- Vitamin A is present in– **Milk, Butter, Fish liver oil**

Search on TG: @apna_pdf

@apna_pdf

- Vegetable oils like wheat germ oil, sunflower oil, etc. are the good source of– **Vitamin E**
- Vitamin C must be supplied regularly in diet because– **It is water soluble hence excreted in urine and can't be stored in the body**
- Deficiency of vitamin E causes– **Muscular weakness**
- Biotin is an organic compound present in yeast. Its deficiency in diet causes dermatitis and paralysis. It is also known as– **Vitamin H**
- Vitamin B_{12} contains– **Co (III)**
- The ..... is water-soluble– **Vitamin B**
- Deficiency of the ..... causes rickets– **Vitamin D**
- Deficiency of vitamin B_1 causes the disease– **Beri-Beri**
- Deficiency of which vitamin causes osteomalacia– **Vitamin D**
- The RBC deficiency is deficiency disease of– **Vitamin B_{12}**
- B group vitamins can be stored in our body– **B_{12}**
- The acids that is a vitamin– **Ascorbic acid**
- A good source of vitamin A & D is– **Cod liver oil**
- Vitamin necessary for blood clotting is– **K**
- The night blindness is developed due to shortage of which vitamin– **Vitamin A**
- Water soluble vitamin is– **Vitamin B**
- Vitamin B_6 is known as– **Pyridoxin**
- Ascorbic acid is a– **Water soluble vitamin**

Nucleic acids

- The non-essential amino acid is– **Alanine**
- The central dogma of molecular genetics states that the genetic information flows from– **DNA → RNA → Proteins**
- Amino acid is– **Lysine**
- Hereditary characteristic are passed on from parents to children through– **Genes**
- Nucleic acids are– **Long chain polymers of nucleotides**
- A nucleoside on hydrolysis gives– **An aldopentose and a nitrogenous base**
- Thymine is– **5-methyluracil**
- Guanine is an example of– **a nitrogenous base**
- Bases common to RNA and DNA are– **Adenine, Guanine, Cytosine**
- In DNA, the complimentary bases are– **Adenine and thymine, guanine and cytosine**
- Two samples of DNA, A and B have melting points 340 K and 350 K respectively. This is because– **B has more GC content than A**
- A unit in nucleic acid which contains 'base-sugar phosphate' unit is called– **Nucleotide**
- RNA is a– **Single helix strand**
- If one strand of DNA has the sequence ATGCTTGA, the sequence in the complimentary strand would be– **TACGAACT**
- The two main differences between RNA and DNA are– **Ribose sugar and uracil in RNA**
- The double strand helix structure of DNA was proposed by– **Watson and Crick**
- When adenine is attached to ribose sugar, it is called adenosine. To make a nucleotide from it, would require– **Addition of phosphate**
- The hormone thyroxine– **is secreted by thyroid**
- Hyperglycemia implies– **High blood-sugar level**
- Sucrose (cane sugar) is a disaccharide. One molecule of sucrose on hydrolysis gives– **1 molecule of glucose + 1 molecule of fructose**
- Proteins are found to have two different types of secondary structures viz. α-helix and β-pleated sheet structure, α-helix structure of protein is stabilised by– **Hydrogen bonds**
- The acids that is a vitamin– **Ascorbic acid**
- Nucleic acids are the polymers of– **Nucleotides**
- Each polypeptide in a protein has amino acids linked with each other in a specific sequence. This sequence of amino acids is said to be– **Primary structure of proteins**
- Complementary bases present in DNA are– **Thymin &Adenine : Guanine & Cytosine**
- DNA-directed synthesis of protein occurs through– **Transcription and Translation**
- Nucelotides contain– **A phosphoric acid group, A nitrogenous base, A pentose sugar**
- The relation between nucleotide triplets and the amino acids is called as– **Genetic code**
- In the double helix structure of DNA, the base pairs are– **Inside the helix**
- The central dogma of molecular genetics states that the genetic information flows from– **DNA → RNA → Proteins**
- The segment of DNA which acts as the instrumental manual for the synthesis of the protein is– **Gene**
- Chargaff's rule states that in an organism– **Amount of adenine (A) is equal to that of thymine (T) and the amount of guanine (G) is equal to that of cytosine (C)**
- A segment of DNA molecule which codes or specifies for one polypeptide chain is called– **Gene**

IGNOU SPY

Search on TG: @apna_pdf
@apna_pdf

- DNA multiplication is called– **Replication**
- The double helical structure of DNA is– **Hydrogen bond**
- Thymine is– **5-Methyluracil**
- If one strand of DNA has the sequence ATGCTTGA, the sequence in the complimentary strand would be– **TACGAACT**
- Guanine is an example of– **A nitrogenous base**
- Name the sugar moiety present in DNA molecules– **β-D-2-deoxyribose**

EXAM POINT

Carbohydrates

Glycosidic linkage between C_1 of α-glucose and C_2 of β-fructose is found in– **Sucrose**	**JEE Main 25.07.2022, Shift-II**
α – D(+) glucose and β–D (+) glucose are– **Anomers**	**CG PET-22.05.2022 [AIEEE 2009], AIPMT - 2000**
Sugar moiety in DNA and RNA molecules respectively are:– **β - D - 2 - deoxyribose, β - D - ribose**	**JEE Main-29.06.2022, Shift-I**
Hydrolysis of sucrose gives–**Dextrorotatory fructose & Laevorotatory glucose**	**AP-EAPCET-12.07.2022, Shift-I**
Animal starch is the other name of :– **Glycogen**	**JEE Main-26.07.2022 Shift-II**
Lactose is made of– **β-D-galactose and β-D- glucose**	**NEET-2020, harkhand – 2019 AP-EAMCET (Engg.)-2014 AMU-2014 JIPMER-2011 Kerala CEE-2010**
Glycerol on treatment with oxalic acid at 110°C forms– **Formic acid**	**VITEEE- 2010**
The IUPAC name of glucose is– **2, 3, 4, 5, 6-pentahydroxy hexanal**	**SRMJEEE – 2009**
The number of chiral centers in (±) – glucose is– **4**	**SRMJEEE – 2014, J&K CET-2006**
Hydrolysis of sucrose with dilute aqueous sulphuric acid yields– **1 : 1 D-(+)-glucose; D-(–)-fructose**	**AP EAMCET-2008**
The artificial sweetener sucralose is ..... .– **Trichloro derivative of sucrose**	**AP EAMCET (Engg.) 18.9.2020 Shift-I**
A non-reducing sugar found in honey is– **(+)–glucose**	**COMEDK-2018**
Cellulose is not digestible by human beings due to the absence of a cellulose hydrolyzing enzyme called– **Cellulase**	**J & K CET-2010**
In sucrose, the glycosidic, linkage is– **α1 : 2 linkage**	**COMEDK-2020**
Fructose is an example of:– **Ketohexose**	**JEE Main 17.03.2021, Shift-II**
A linkage between two monosaccharide units through oxygen atom is known as– **Glycosidic linkage**	**AMU-2019**
On hydrolysis, one mole of maltose yields– **Two moles of D–glucose**	**AMU–2006**
Cow milk is an example of natural emulsion stabilized by– **Casein**	**JIPMER-2012 AMU-2005**
Iodine test is shown by– **Starch**	**BCECE-2007**
Saccharin is a/an– **Sweetening agent**	**BCECE-2010**

Search on TG: @apna_pdf

@apna_pdf

D-glucose and D-mannose are the example of–	**C-2 epimer**	**BCECE-2016**
Hydrolysis of cellulose gives–	**D–glucose**	**JCECE-2015, [BITSAT-2012] AIEEE-2003**
Blood sugar is–	**Glucose**	**CG PET -2006**
Lactose sugar is formed from–	**D- galactose and D- glucose**	**CG PET -2006**
Sucrose and glucose can be distinguished by–	**Fehling's solution**	**CG PET -2017**
Glucose is obtained from–	**Starch**	**CG PET- 2010**
Glucose and galactose are having identical configuration in all the positions except position.–	**C-4**	**JEE Main-12.04.2019 Shift-I**
Biuret test is not given by–	**Carbohydrates**	**[AIEEE 2010]**
Hydrolysis of sucrose gives–	**α-D-(+)-glucose and β-D(–)-fructose**	**[JEE Main 2021, 27 Aug shift-II]**
Two monomers in maltose are–	**α-D-glucose and α-D-glucose**	**[JEE Main 2020, 8 Jan Shift-II]**
Maltose on treatment with dilute HCl gives–	**D-glucose**	**[JEE Main 2019, 8 April Shift-I]**
Fructose and glucose can be distinguished by–	**Seliwanoff's test**	**[JEE Main 2019, 8 April Shift-II]**
Amylopectin is composed of–	**α-D-glucose, C_1-C_4 and C_1-C_6 linkages**	**[JEE Main 2019, 10 April Shift-I]**
Glucose on prolonged heating with HI gives–	**n-hexane**	**[JEE Main 2018] Karnataka CET -2013**
The change in the optical rotation of freshly prepared solution of glucose is known as–	**Mutarotation**	**[AIEEE 2011]**
Glucose and fructose can be distinguished by–	**Benedict reagent test**	**J & K CET-(2012)**
Glucose can be converted into ethyl alcohol using–	**Zymase**	**J & K CET-(2012)**
The anomeric carbon in D (+) glucose is–	**C-1 carbon**	**J & K CET-2008**
Methyl α-D-glucoside and methyl β-D-glucoside are–	**Anomers**	**JCECE - 2013**
Reducing sugar is–	**Maltose**	**JCECE - 2018**
Six membered cyclic structure of glucose is called–	**Pyranose**	**JCECE - 2018**
The general molecular formula for disaccharide–	**$C_{12}H_{22}O_{11}$**	**JIPMER-2010**
Saccharin an artificial sweetener is manufactured from–	**Toluene**	**JIPMER-2019 Karnataka CET-2012**
Invert sugar is mixture of–	**D-glucose + D-fructose**	**JIPMER-2019**
The glycosidic linkage present in sucrose is between–	**C–1 of α– glucose and C – 2 of β– fructose**	**Karnataka CET-2017**
α-maltose consists of–	**Two α-D-glucopyranose units with 1-4 glycosidic linkage**	**Karnataka CET-2011**
RNA and DNA are chiral molecules, their chirality is due to the presence of–	**D–sugar component**	**Karnataka CET-2021**
An invert sugar is–	**Levorotatory**	**Kerala CEE-2019**
Molisch test is given by :–	**All carbohydrates**	**Manipal-2018**
Reduction of glucose with $NaBH_4$ gives:–	**Sorbitol**	**Manipal-2017**
Butylated hydroxy toluene is used in Preventing–	**Oxidative rancidity of fats**	**MHT CET-2014**
Glucose on reaction with Br_2 water gives–	**Gluconic acid**	**MHT CET-2011**

JEAM SPY

Search on TG: @apna_pdf

@apna_pdf

Glucose on reaction with Fehling solution gives–	**Cuprous oxide**	**MHT CET-2010**
Fats are ester of–	**Sugar**	**MHT CET-2007**
Sucrose on hydrolysis gives–	**Glucose and fructose**	**MHT CET-2007**
Table sugar is–	**Sucrose**	**UP CPMT-2009**
A mixture of amylose and amylopectin is called–	**Starch**	**UP CPMT-2008**
Glucose reacts with excess of phenyl hydrazine and forms–	**Glucosazone**	**UP CPMT-2006**

Proteins

The structure of protein that is unaffected by heating is–	**Primary Structure**	**JEE Main-29.06.2022, Shift-II**
The total number by amino acids present in insulin is–	**51**	**AP EAMCET-06.07.2022 Shift-I**
The number of peptide bond, present in a tetrapeptide is–	**3**	**Assam CEE-2018**
The Hormone that maintains the blood glucose level within the limit is–	**Insulin**	**TS EAMCET-2016**
The site of action of insulin is–	**Plasma membrane**	**BCECE 2014 AP EAMCET (Engg.) 2012**
Insulin is–	**Peptide hormone**	**Assam CEE-2014**
Tissues in the organs of living beings are made up of:–	**Proteins**	**MPPET - 2012**
The protein present in the hair is–	**Keratin**	**JCECE-2012**
The secondary structure of a protein refers to–	**α-helical backbone**	**VITEEE- 2011 BITSAT-2010 AIEEE-2007**
A distinctive and characteristic functional group of fats is–	**An ester group**	**SRMJEEE – 2014**
Denaturation does not involve–	**The loss of primary structure.**	**SRMJEEE – 2016**
Hydrolysis of proteins gives–	**α-amino acids**	**AP EAMCET (Engg.) 17.09.2020, Shift-II**
The secondary structure of protein is stabilised by:–	**Hydrogen bonding**	**JEE Main 16.03.2021, Shift-II**
Biuret test is given by–	**Proteins**	**COMEDK 2016**
The protein that is responsible for blood clotting is–	**Fibrinogen**	**COMEDK 2020**
In the primary structure of proteins, the amino acids are interconnected by–	**peptide bonds**	**AIIMS 26 May 2019 (Evening)**
Denaturation of proteins leads to loss of its biological activity by–	**Loss of both secondary and tertiary structure**	**AIIMS-2012 JCECE - 2010**
α-Amino acids are–	**Acidic due to $-NH_3^+$ group and basic due to $-COO^-$ group**	**AIIMS-2011**
The term 'quaternary structure' is used in the context of–	**Proteins**	**BCECE-2009**
The coiled form of a fibrous protein is known as–	**Globular protein**	**CG PET- 2016**
The number of disulphide linkages present in insulin are–	**3**	**JCECE 2010 Karnataka CET-2013, 2008**
Fibrous protein are not present in–	**Albumins**	**CG PET- 2012**
The helical structure of proteins is stabilised by–	**Hydrogen bond**	**JEE Main 2021, 16 March Shift-II BITSAT-2012 UPTU/UPSEE-2007 AIPMT -2004 CG PET -2004**

Search on TG: @apna_pdf

@apna_pdf

The bonds in protein structure that are not broken on denaturation are– **Peptide bond**	**CG PET -2017**
The water soluble protein is– **Albumin**	**JEE Main 2021, 22 July Shift-I**
Polypeptides having, molecular weights above 10,000 are known as– **Proteins**	**J & K CET-2007**
Proteins is heated with conc. HNO_3 give yellow colour. This is known as– **Xanthoprotic test**	**JCECE - 2015**
The highest calorific value is found in– **Fats**	**JCECE - 2015**
Proteins are composed of– **α-amino acids**	**JIPMER-2010**
Dialysis can be used to separate– **Glucose and protein**	**Karnataka CET-2012**
Myosin (s) are :– **Fibrous proteins**	**Manipal-2016**
The prosthetic group of haemoglobin is– **Haem group**	**MHT CET-2011**
Protein gives blue colour with– **Ninhydrin**	**MHT CET-2007**
Peptization denotes– **Breaking and dispersion into colloidal state**	**MHT CET-2007**
Proteins are:– **Polypeptides with high molecular weights**	**UPTU/UPSEE-2006**
The optically inactive α-amino acid is.– **Glycine**	**Assam CEE-31.07.2022**
The sequence in which the α-aminoacids are linked to one another in a protein molecule is called its.– **Primary structure**	**Assam CEE-31.07.2022**
Amino acids are obtained from the hydrolysis of .....– **Proteins**	**MPPET-2013**
The amino acid containing indole part in:– **Tryptophan**	**AP EAMCET (Engg.) 2015**
The number of complementary hydrogen bond(s) between a guanine and cytosine pair is– **3**	**TS EAMCET-2017**
Amino acids exist as zwitter ions at– **Isoelectric pH**	**COMEDK-2014**
Sulphur containing amino acid is– **Cysteine**	**COMEDK-2017**
Ninhydrin test is used in identification of– **Amino acids**	**COMEDK-2018**
Lysine is least soluble in water in the pH range of:– **8 to 9**	**AIIMS-2006**
The transfer RNA anticodon for the messenger RNA codon G–C–A is– **C–G–U**	**BITSAT-2017**
The pyrimidine bases present in DNA are– **Cytosine and thymine**	**AIEEE 2006**
Thiol group is present in– **Cysteine**	**JEE Main 2016**
The product formed in the reaction of glycine with benzoyl chloride + aq. NaOH is– **$PhCONHCH_2CO_2H$**	**J & K CET-2006**
Peptides are formed from– **α-amino acids**	**J & K CET-2005**
In an alkaline medium, glycine predominantly exists as/in a/an– **Anion**	**Karnataka CET-2011**
The amino acid containing mercaptan unit is– **Cysteine**	**Kerala CEE-2016**
Protein is a polymer made of– **Amino acids**	**Kerala CEE-2017**
The nitrogeneous base present only in RNA is– **Uracil**	**Kerala CEE-2018**
Glycine can be obtained from formaldehyde by:– **Strecker synthesis**	**Manipal-2017**
In a protein molecule various amino acids are linked together by– **Peptide bond**	**NEET-I 2016**
The number of amino acids and number of peptide bonds in a linear tetrapeptide (made of different amino acids) are respectively– **4 and 3**	**WB JEE-2014**

Enzymes and Harmones

The enzyme that converts glucose into ethyl alcohol and carbon dioxide–**Zymase**	**JHARKHAND – 2019**
Metabolic function in human bodies is carried out by:– **Enzymes**	**MPPET - 2012**

TEAM SPM

Search on TG: @apna_pdf

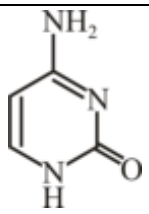
@apna_pdf

Enzymes are–	**Proteins**	**Assam CEE-2020**
Enzymes are made up of–	**Proteins with specific structure**	**BCECE-2012, CG PET-2007 AIPMT -2002**
Monovalent sodium and potassium ions, divalent magnesium and calcium ions are found in–	**Biological fluids**	**J & K CET-2014**
Surface of the eye is protected from bacterial infection by enzyme–	**Lysozyme**	**JCECE - 2014**
The efficiency of enzyme catalysis is due to its capacity to–	**Lower the activation energy of the reaction**	**Kerala CEE-2007**
The enzyme that converts maltose to glucose is–	**Maltase**	**MHT CET-02.05.2019 SHIFT-II**
The cell membranes are mainly composed of–	**Phospholipids**	**AIPMT -2005**
Vitamins		
Vitamin-A is called -	**Retinol**	**AP EAPCET 24.08.2021 Shift-II**
Vitamin B_1 is-	**Thiamine**	**AP EAMCET 08.07.2022 Shift-I AP EAPCET 20.08.2021 Shift-I**
The human body does not produce-	**Vitamins**	**AP EAPCET 20.08.2021 Shift-II CG PET- 2013**
Deficiency of Vitamin H causes–	**Skin diseases**	**Gujarat CET- 2007**
The deficiency of vitamin K causes–	**Excessive bleeding injury**	**Assam CEE-2014**
Vitamin B_{12} contains–	**Co metal**	**BCECE-2007 UPTU/UPSEE-2006 CG PET-2006 AIPMT -2003 J&K CET -1998 Karnatka CET -2007**
Deficiency of vitamin E causes:–	**Loss of fertility**	**BITSAT-2005**
Scurvy is caused by the deficiency of vitamin–	**C**	**BITSAT-2006 JIPMER-2013**
The deficiency of vitamin-B_1 causes–	**Beri -beri**	**AIPMT -2012 CG PET -2005**
Nightblindness is caused due to the deficiency of–	**Vitamin A**	**CG PET -2006**
Thiamine and pyridoxine are also known respectively as–	**Vitamin B_1 and Vitamin B_6**	**JEE Main 2021, 22 July Shift-II**
Deficiency of vitamin K causes–	**Increase in blood clotting time**	**JEE Main 2021, 18 March Shift-II**
Ascorbic acid is also known as–	**Vitamin C**	**J & K CET-2005**
The best source of vitamin A is–	**Carrot**	**JCECE - 2007**
The vitamin that belongs to aromatic series is–	**K**	**MHT CET -03.05.2019, SHIFT-I**
The RBC deficiency is deficiency disease of–	**Vitamin B_{12}**	**NEET 2021**
Ascorbic acid is a–	**Water soluble vitamin**	**UP CPMT-2010 UPTU/UPSEE-2007**

Search on TG: @apna_pdf

@apna_pdf

Nucleic Acids

Sugar present in DNA is– **β – D – 2 – deoxyribose**	**AP EAMCET-07.07.2022 Shift-II**
The number of hydrogen bonds between guanine and cytosine; and between adenine and thymine in DNA is– **3, 2**	**AP EAMCET (Engg.) -2013**
The base present in cytidine is– 	**AP EAMCET(MEDICAL) - 2009**
A nucleoside on hydrolysis gives– **An aldopentose and a heterocyclic base**	**COMEDK 2011**
In DNA, the linkages between different nitrogenous bases by– **H-bonding**	**Karnataka NEET 2013**
In nucleic acids the nucleotides are linked by– **Ester linkage**	**COMEDK 2014**
Thymine is– **5-methyluracil**	**COMEDK-2017 AIIMS-2009**
The iron species are present in – **Haemoglobin, cytochromes**	**AIIMS-2006**
The energy stored in the cells of a living body is in the form of– **ATP**	**BCECE-2010**
The blue colour of snail is due to presence of– **Haemocyanin**	**BITSAT-2018**
Number of peptide bonds in dipeptide is– **1**	**CG PET -2006**
DNA and RNA are chiral molecules due to the presence of– **D-sugar component**	**Kerala CEE-29.08.2021 CG PET -2018 AIPMT -2007**
Metabolic activities of cells are controlled by:– **DNA**	**HP CET-2018**
Nucleic acids are polymers of– **Nucleotides**	**J & K CET-2013**
In DNA, the complimentary bases are– **Adenine and thymine, guanine and cytosine**	**JIPMER-2014 AIPMT -2008,1998**
In nucleic acids, the nucleotides are joined together by– **Phosphodiester linkage**	**Karnataka-CET-2019, 2015**
Adenosine is an example of– **Nucleoside**	**Karnataka-CET-2015**
The sugar moiety present in RNA molecule is– **β-D-ribose**	**Kerala CEE-2014**
In double strand helix structure of DNA, heterocyclic base cytosine forms hydrogen bond with– **Guanine**	**Kerala CEE-2016**
The common names of the lower fatty acids are obtained from– **The sources from which they are obtained**	**MHT CET-2010**
In RNA pentose sugar unit is– **Ribose**	**Tripura JEE-2019**
A Zwitter ion is– **An ion with positive and negative charge at different points on it**	**UPTU/UPSEE-2008**
ADP and ATP differ in the number of– **Phosphate units**	**WB JEE-2017**
In both DNA and RNA, heterocylic base and phosphate ester linkages are at– **C'_1 and C'_5 respectively of the sugar molecule**	**AIEEE 2005**
In DNA, the consecutive deoxynucleotides are connected via– **Phosphodiester linkage**	**WB JEE-2014**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

28. Polymers

Classification of polymers

- The strongest intermolecular forces of attraction are present in– **Fibres**
- Natural polymer is a– **Cellulose**
- An example of semi-synthetic polymer is– **Cellulose acetate**
- Rayon is chemically known as– **Cellulose acetate**
- The S in Buna - S refer to– **Styrene**
- Nylon is an example of– **Polyamide**
- Thermosetting polymer is a– **Bakelite**
- Linear polymer is a– **Nylon**
- The branched chain polymer is– **Low density polythene**

Type of polymerization reaction

- The constituent of nylon-6, 6 is– **Adipic acid**
- Thermoplastics are– **Polythene, PCC, Teflon**
- The polymers that involves hydrolysis reaction– **Nylon-6**
- The polymers that are used as fibre– **Nylon**
- The polymer used in manufacture of 'orlon' is– **PAN**
- Polymer used in manufacturing of rain coats is– **Polyvinyl chloride**
- The polymers that is used in the manufacturing of ropes– **Polypropene**
- Urea-formaldehyle resin is used for making– **Unbreakable cups, Laminated sheets**
- The polymers that is used for making combs and electrical switches is– **Bakelite**
- Polymer formation from monomers starts by– **Condensation reaction between monomers**
- Glyptal polymer is obtained from glycol by reacting with– **Phthalic acid**
- Natural silk is a– **Polypeptide**
- The polymer that is used in the manufacture of wood laminates– **Urea formaldehyde resin**
- The polymer used for coating electrical wires, cables, etc.– **PVC**
- Soft drinks and baby feeding bottles are generally made up of– **Polystyrene**
- Currently used as a tyre cord is– **Nylon - 6**
- Polyester polymer is classified as– **Terylene**
- The polymer that is bakelite– **Condensation polymer**
- In addition polymer, monomer used is– **Unsaturated compounds**
- 'Cis-1, 4-polyisoprene' is– **Elastic (rubber)**
- Example of condensation polymer is– **Nylon, Bakelite, Melamine-formaldehyde resin**
- Addition polymer is a– **Polyethylene**
- Synthetic rubber is– **Buna-N, Neoprene**
- Terylene is– **A condensation polymer with a benzene ring in every repeating unit**
- Teflon and neoprene are the examples of– **Homopolymers**
- Synthetic polymer prepared by using caprolactam is known as– **Nylon 6**
- In vulcanization of rubber– **Sulphur cross - links are introduced**
- A polymer of prop-2-ene nitrile is called– **Orlon**
- Novolac on heating with formaldehyde undergoes X to form an infusible solid mass called Y. X & Y are, respectively– **Cross - linking, bakelite**
- Copolymer is a– **Buna - S**
- Addition homopolymer is a– **Polythene, Teflon, PVC**
- Polymerisation of glycol with dicarboxylic acids is– **Condensation polymerisation**
- Formation of polytetrafluoroethene is a– **Chain growth polymerisation in presence of persulphate as a catalyst**
- The repeating structural unit in neoprene is– **Chloroprene**
- Nylon threads are made of– **Polyamide polymer**
- Heating rubber with sulphur is known as– **Vulcanisation**
- An example of fibre is– **Silk, Dacron, Nylon-6, 6**
- Homopolymer is a– **Neoprene**
- Repeating similar structural units gives– **Homopolymers**
- Adipic acid is used in the preparation of– **Nylon-6,6**
- Buna-N is used in making oil seals & tank lining because– **It is resistant to action of lubricating oil and organies solvents**

Search on TG: @apna_pdf

@apna_pdf

- Nylon - 6, 6 is– **Polyamide**
- Used to make 'non-stick' cookware is– **Poly tetrafluoroethylene**
- An example of copolymer is– **Buna - S**
- The rubber used for manufacturing tyres is vulcanised with– **5% Sulphur**
- Nylon - 6, 6 is obtained from– **Adipic acid and hexamethylene diamine**
- Natural rubber is a polymer of– **2 - Methyl - 1, 3 - butadiene**
- Monomer of dacron is– **Terephthalic acid**
- Condensation polymer is– **Polyester**
- An example of synthetic rubber is– **Neoprene**
- The product of addition polymerisation reaction is– **PVC**
- The catalyst used for the polymerisation of olefins is– **Ziegler Natta catalyst**
- Terylene is the polymer of– **Ethylene glycol and terephthalic acid**
- Orlon is a polymer of– **Acrylonitrile**
- The intermolecular forces that are present in 'nylon – 6, 6' is– **Hydrogen bonding**
- The fibres that are made of polyamides– **Nylon**
- Synthetic fibres like nylon-6,6 are very strong because– **They have linear molecules interlinked with forces like hydrogen bonding**
- Teflon is a polymer of the monomer– **Tetrafluoroethene**
- The synthetic polymer which resembles natural rubber is– **Neoprene**
- The polymer that has ester linkage– **Terylene**
- Amide linkage has– **Nylon – 6, 6**
- Chemical name of melamine is– **2,4,6–triamino- 1,3,5-triazine**
- Example of condensation polymers is– **Terylene**
- An example of chain growth polymer is– **Teflon**
- Natural rubber is a– **Polyisoprene**
- HDP is used for manufacturing of– **Buckets**
- ..... is used in making oil seals and gaskets– **Teflon**
- Cis-1, 4 polyisoprene is known as– **Natural rubber**
- The monomers of Bakelite are– **Phenol + formaldehyde**
- Melamine resin is obtained from melamine by reacting with– **HCHO**
- In propagation step, the reaction intermediate of radical polymerisation is– **Free-radical**
- ..... polymer is prepared from caprolactam– **Nylon-6**
- Heating of rubber with sulphur is known as– **Vulcanisation**
- Nylon threads are made of– **Polyamide polymers**
- ..... of sulphur is used in the vulcanization of rubber– **5%**
- The monomers of Buna S rubber are– **Styrene and butadiene**
- Zeigler-Natta catalyst is– **$R_3Al/TiCl_4$**
- ..... contains isoprene units– **Natural rubber**
- Orlon is a polymer of– **Acrylonitrile**
- Intermolecular force present in nylon-6, 6 is– **Hydrogen bond**
- ..... polymers is are chlorinated– **Neoprene, PVC**
- Glyptal is copolymer of– **Phthalic acid and glycol**
- In order to give strength and elasticity, natural rubber is heated with– **Sulphur**
- Bakelite is a product formed from– **Reaction of HCHO and phenol**
- Monomers of Nylon 2, Nylon 6 is– **Glycine and aminocaproic acid**
- ..... is used for the formation of Nylon 66– **Adipic acid**
- Polymerisation of acrylonitrile will best take place by– **Anionic polymerisation**
- Polymer of perfluoroethylene is– **Teflon**
- Polymer formation from monomers starts by– **Condensation reaction between monomers**
- ..... polymers is prepared by condensation polymerization– **Nylon 6, 6**
- Natural rubber has– **All cis-configuration**
- The organic compounds polymerizes to form the polyester Dacron– **Terephthalic acid and ethylene glycol**
- Caprolactam is used for the manufacture of– **Nylon-6**
- Nylon is an example of– **Polyamide**
- The straight chain polymer is formed by– **Hydrolysis of $(CH_3)_2SiCl_2$ followed by condensation polymerisation**
- The set of polymers contains same monomer which is used to prepare urotropine on reaction with NH_3– **Nylon-6 urea-formaldehyde resin, melamine-formaldehyde resin**
- The bakelite is prepared by the reaction between– **Phenol and formaldehyde**
- Terylene is a condensation polymer of ethylene glycol and– **Terephthalic acid**
- $CF_2 = CF_2$ is monomer of– **Teflon**

Biodegradable polymers

- The polymer used in orthopaedic devices and in controlled drug release is– **PHBV**
- The polymers can be used for lubrication and as an insulator– **PTFE**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

- The polymer that has 'chiral' monomer(s)– **PHBV**
- The monomer unit of natural rubber is–

$$CH_2 = \underset{\displaystyle CH_3}{\overset{|}{C}} - CH = CH_2$$

- The commercial name of polyacrylonitrile is– **Orlon (acrilan)**
- The polymers that is prepared by addition polymerisation– **Teflon**
- Natural polymer is a– **cis-1,4-polyisoprene**
- The biodegradable polymer is– **Nylon-2-Nylon-6**

- A natural polymer is– **Cellulose**
- A synthetic polymer is– **Polyethylene**
- A linear polymer is– **High density polythene**
- A cross linked polymer is– **Bakelite**
- An addition polymer is– **Buna S**
- A condensation polymer is– **Nylon 6**
- A thermosetting polymer is– **Urea-formaldehyde resin**
- An elastomer is– **Buna S**
- The ..... is chain growth polymer– **Polypropylene**
- An example of natural biopolymer is– **DNA**
- A condensation polymer is– **Dacron**
- The ..... is fully fluorinated polymer– **Teflon**
- The ..... is a thermosetting polymer– **Bakelite**
- The ..... is a semisynthetic polymer– **Guncotton**
- Terylene is an example of– **Polyester**
- Fibre is– **Nylon 66**
- ..... is classified as polyester polymer– **Bakellite**
- Natural rubber is a polymer of– **Ethyne**
- The polymers is prepared by condensation polymerization– **Nylon-6, 6**
- ..... is a chain growth polymer **Polystyrene**
- Biodegradable polymer is a– **Cellulose, PHBV, Nylon - 2 - nylon - 6**
- The monomer of biodegradable polymer, nylon 2 - nylon 6 are– **Glycine + amino caproic acid**
- PHBV is obtained by the copolymerisation of– **3-Hydroxybutanoic acid and 3 - hydroxypentanoic acid**
- Biodegradable polymer is a– **Cellulose**

Polymers of commercial importance

- ..... polymer is used in the manufacture of unbreakable crockery– **Melamine resin**
- Soft drinks and baby feeding bottles are generally made up of– **Polystyrene**
- ..... is currently used as a tyre cord– **Nylon 6**
- ..... is used to make 'non-stick' cookware– **Polytetrafluoroethylene**
- The ..... is biodegradable polymer– **PHBV, Cellulose**
- Biodegradable polymer which can be produced from glycine and aminocaroic acid is– **Nylon 2-nylon 6**
- Glycogen, a naturally occurring polymer stored in animals is a– **Polysaccharide**
- Polystyrene is– **A thermoplastic polymer**
- Linear polymer is a– **PVC**
- The S in buna-S refers to– **Styrene**
- Thermoplastic polymers are– **Polythene, polystyrene, polyvinyls**
- Bakelite is an example of– **Thermosetting**
- Teflon and neoprene are the examples of– **Homopolymers**
- The sets that contains only condensation polymers– **Buna-S, nylon, terylene**
- The monomers used in addition polymerisation through free radical should be very pure because– **The traces of impurities act like inhibitors resulting in short chain polymers**
- High density polythene is obtained by– **Polymerisation of ethene in a hydrocarbon solvent in the presence of Ziegler-Natta catalyst**
- The difference in the densities of low density (LDP) and high density polymers (HDP) is due to the fact that– **LDP are highly branched structures while HDP consists of closely packed linear molecules**
- Composition of Ziegler-Natta catalyst is– **$(Et)_3Al$-$TiCl_4$**
- Terylene is a condensation polymer of ethylene glycol and– **Terephthalic acid**
- Nylon 6,6 is obtained by condensation polymerisation of– **Adipic acid and hexamethylenediamine**
- Synthetic polymer prepared by using caprolactam is known as– **Nylon 6**
- Condensation polymerisation is a– **Polyester**
- Polymer which has amide linkage is– **Nylon-6, 6**
- Dacron is an example of– **Polyesters**
- Cross-linked polymer is a– **Melamine-formaldehyde**
- Natural rubber is a polymer of– **2-methyl-1, 3-butadiene**
- cis-Polyisoprene possesses elastic property because– **It has a coiled structure and chains held together by weak van der Waals' forces**

TEARSPY

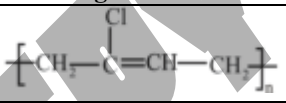
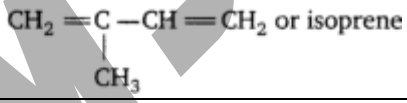
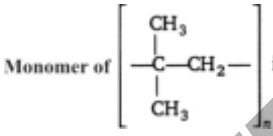
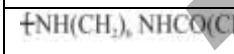
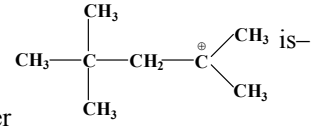
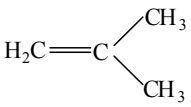
Search on TG: @apna_pdf

@apna_pdf

- Heating rubber with sulphur is known as–**Vulcanisation**
- In vulcanization of rubber–
  Sulphur cross-links are introduced
- The monomers of biodegradable polymer, nylon 2-nylon 6 are– **Glycine + amino caproic acid**
- The polymers of glucose that is stored by animals–
  Glycogen
- The commercial name of polyacrylonitrile is–
  Orlon (acrilan)
- Vulcanization of rubber is carried out by heating a mixture of– **Isoprene and sulphur**
- Terylene polymer is obtained by condensation of–
  Ethane-1, 2-diol and benzene-1, 4 dicarboxylic acid
- Natural polymer is a–
  cis-1, 4-polyisoprene
- PVC is an example of–
  Thermoplastic

EXAM POINT

Classification of Polymers

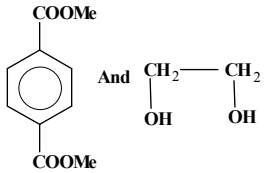
The monomer of Teflon is :–	**$CF_2 = CF_2$**	**JCECE - 2007, UPTU/ UPSEE- 2005**
Natural rubber is–	**A polymer of 2-methyl 1, 3 butadiene**	**MHT CET-2012 MPPET- 2009, CG PET -2006**
Thermosetting plastics once set cannot be remoulded and reshaped because of the presence of ____ between the polymeric chains.–	**strong covalent forces**	**SRMJEEE – 2016**
The structure of Neoprene is:– 		**JEE Main 26.02.2021, Shift-I**
Teflon, elive and neoprene are all–	**Homopolymers**	**(AIIMS-2012)**
Methyl-α-D-glucoside and methyl-β-D-glucoside are:–	**Anomers**	**(AIIMS-2006)**
Natural rubber is a polymer of– 	or isoprene	**BCECE-2008 UPCPMT-2006**
Monomer of  is	2-methylpropene	**AIIMS-26.05.2019 (E) BCECE-2012, CGPET-2013, AIPMT -2002 AP- EAMCET (Medical)-2008**
Polymer formation from monomers starts by–	**condensation reaction between monomers**	**JIPMER-2017 [BITSAT-2006]**
 is a–	**copolymer**	**AIIMS-26.05.2019 (E), CG PET -2007, AIPMT-2006**
Nylon is a–	**polyamide**	**J&K CET-2015 CG PET -2005,NEET -2013**
Starch is the polymer of–	**glucose**	**CG PET -2005**
Polythene is an addition polymer of–	**ethane**	**CG PET -2005**
Monomer of polythene is–	**ethylene**	**CG PET -2006**
Monomer units of dacron polymer are–	**Ethylene glycol and terephthalic acid**	**[JEE Main 2021, 01 Sep Shift-II]**
Monomer of novolac is–	**o-hydroxymethylphenol**	**[JEE Main 2021, 31 Aug Shift-I]**
Staggered and eclipsed conformers of ethane are–	**Rotamers**	**[JEE Main 2021, 27 July Shift-I]**
The monomer of the polymer  is– 		**JCECE – 2012 JIPMER-2007**

TEAM SPY

Search on TG: @apna_pdf
@apna_pdf

The monomeric unit of orlon molecule is–	**CH_2=CH–CN**	**JCECE – 2014**
An example of natural biopolymer is–	**DNA**	**JIPMER-2012 AIPMT -1994**
The monomer of Teflon is–	**CF_2=CF_2**	**JIPMER-2008**
A polymer which becomes soft on heating and hard on cooling, belongs to class of–	**thermoplastic polymer**	**MHT CET-03.05.2019, SHIFT-I**
Nylone-6,6 is a–	**Polyamide**	**MHT CET-2012**
Natural rubber has–	**all cis-configuration**	**(NEET-I 2016)**
Neoprene is–	**synthetic rubber**	**UP CPMT-2010**
Bakelite is a–	**condensation polymer**	**UPTU/UPSEE-2009**
Terylene is not a–	**chain growth polymer**	**Karnataka-CET-2014**
Teflon is an example of polymer which is a/an.–	**addition polymer**	**UPTU/UPSEE-2015**

Type of Polymerisation Reaction

Terylene polymer is obtained by condensation of:– **Ethane-1, 2-diol and Benzene-1, 4 dicarboxylic acid**	**JEE Main-28.07.2022, Shift-I**
The catalyst used in the manufacture of polyethylene is a mixture of– **$TiCl_4$, $Al(C_2H_5)_3$**	**AP EAMCET-04.07.2022 Shift-I**
Copolymerization of 1, 3-butadiene and acrylonitrile in the presence of a peroxide catalyst gives.– **Buna-N**	**Assam-CEE-31.07.2022**
Vulcanization of rubber is carried out by heating a mixture of :– **isoprene and sulphur**	**JEE Main-26.07.2022, Shift-II**
The polymer manufactured by condensation polymerization is:– **polyethylene**	**MPPET – 2012**
In the preparation of Nylon– 6 from cyclohexanone oxime use is made of a rearrangement reaction. This rearrangement reaction is called– **Beckmann rearrangement**	**MPPET- 2009**
The polymer obtained with methylene bridges by condensation polymer is:– **bakelite**	**AP EAMCET (Engg.) 2015**
Nylon-6 is produced by the– **self condensation reaction.**	**SRMJEEE – 2016**
The raw material used in nylon-6 is– **Caprolactum**	**AP EAMCET (Medical) - 2007**
Chain transfer reagent is– **CCl_4**	**(AIIMS-2007)**
Polymer with low degree of polymerization is known as– **copolymer**	**AMU-2015**
Buna-N is a copolymer of– **1, 3-Butadiene and acrylonitrile**	**Assam CEE-2020**
Condensation product of caprolactum is:– **Nylon 6**	**BCECE-2005**
Dimethyl terephthalate and ethylene glycol react to form– **dacron**	**BCECE-2010**
The catayst used in the manufacture of polythene by Zeigler method is– **titanium tetrachloride and triethyl aluminium**	**BCECE-2016**
Terylene is a condensation polymer of ethylene glycol and– **terephthalic acid**	**BCECE-2017**
Nylon obtained by the condensation of adipic acid with hexamethylene diamine– **nylon 6,6**	**CG PET -2006**
Terylene is a condensation polymer of _____ and _____.– 	**GUJCET-2019**
Thermosetting polymer, Bakelite is formed by the reaction of phenol with– **HCHO**	**[AIEEE 2011]**
Preparation of bakelite proceeds via reactions– **Electrophilic substitution and dehydration**	**[JEE Main 2020, 8 Jan Shift-II]**
The polymer formed on heating novolac with formaldehyde is– **Bakelite**	**[JEE Main 2021, 26 Aug shift-I]**
Polycondensation products of dicarboxylic acids and diols are– **polyesters**	**J & K CET-(2014)**
Buna-N synthetic rubber is obtained by copolymerization of– **CH_2 = CH – CN and H_2C = CH – CH = CH_2**	**J & K CET-(2015)**
The polymer used in the manufacture of 'Orlon' is– **PAN**	**J & K CET-(2009)**
Glyptal polymer is obtained from glycol by reacting with– **phthalic acid**	**JCECE - 2010**

Search on TG: @apna_pdf

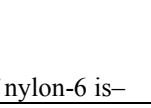
@apna_pdf

Heating of rubber with sulphur is called– **vulcanisation**	**JIPMER-2010**
Styrene can be purified by– **vacuum distillation**	**JIPMER-2008**
Cis-1, 4-polyisoprene is called– **natural rubber**	**Karnataka-CET-2019**
$(CH_3)_3$ SiCl is used during polymerization of organosilicons because– **the chain length of organosilicon polymers can be controlled by adding $(CH_3)_3SiCl$**	**Karnataka-CET-2018**
Natural rubber is a polymer of monomer isoprene. During polymerisation:– **1, 4 addition takes place**	**Manipal-2020**
The monomers used for the preparation of nylon 2-nylon 6 is/are– **glycine and amino caproic acid**	**Kerala-CEE-2011**
The monomers used in the preparation of dextron are– **lactic acid and glycolic acid**	**MHT CET-02.05.2019, SHIFT-II, MHT CET-2014**
Lactic acid and glycolic acid are the monomers used for preparation of polymer–**de**	**MHT CET-2018**
Adipic acid is used in the preparation of– **nylon-66**	**MHT CET-2009**
Bakelite is obtained from phenol by reacting with:– **formaldehyde**	**JCECE - 2017, JCECE-2015 J & K CET-(2013), J & K CET-(2012) UPTU/UPSEE-2006, [AIEEE 2008] J & K CET-(2000, 1997) (AIPMT-1995), BCECE-2017**
Teflon polymer is formed by polymerization of:– **$F_2C=CF_2$**	**UPTU/UPSEE-2005**
In the manufacture of polythene the catalyst used is– **$TiCl_4$**	**SRMJEEE – 2010**
Nylon-6,6 is an example of a polymer formed by– **step growth polymerization.**	**COMEDK 2015**
Nylon-6 is obtained by the condensation of–**caprolactum with water at high temperature**	**AMU-2016**
In Bakelite, the rings are joined to each other through– **$–CH_2–$**	**AMU – 2010**
Bakelite is prepared by reaction between– **phenol and formaldehyde**	**BCECE-2007**
Bakelite is polymer of phenol and– **HCHO**	**CG PET- 2013**
The homopolymer formed from 4-hydroxybutanoic acid is– $\left[\begin{matrix}O & O\\ \| & \|\\ C(CH_2)_2C-O\end{matrix}\right]_n$	**[JEE Main 2019, 11 Jan Shift-II]**
The monomers used for the synthesis of Buna-N are– **1, 3-Butadiene and Acrylonitrile**	**JHARKHAND – 2019**
The monomer of cellulose is– **Glucose**	**MPPET- 2009**
The poly dispersity index (PDI) of a polymer is ($\bar{M}_w$ = weight average molecular mass and $\bar{M}_n$ = number average molecular mass)–**the ratio between $\bar{M}_w$ and $\bar{M}_n$**	**TS-EAMCET-2016**
Natural rubber has _____ unit in its structure.– **cis-polyisoprene**	**SRMJEEE – 2016**
1, 3-butadiene and styrene on polymerization give– **Buna-S**	**AP- EAMCET(Medical) -2010**
Intermolecular forces in nylon-6, 6 are– **hydrogen bonding**	**AP EAMCET (Engg.) 18.09.2020, Shift-I**
The monomers of buna-S rubber are– **Styrene and butadiene**	**TS EAMCET-2017**
The monomer of neoprene is– **2-chloro-1,3-butadiene**	**AP EAMCET (Engg.) 2012**
Composition of Ziegler-Natta catalyst is– **$(Et)_3Al.\ TiCl_4$**	**COMEDK-2018**
The repeating unit present in Nylon 6 is– **$–[CO(CH_2)_5NH]–$**	**(AIIMS-2016)**
The polymer used as a substitute for wool in making commercial fibers is– **polyacrylonitrile**	**AMU-2017**
Nylon-6 is obtained by– Heating caprolactum with water at high temperature	**Assam CEE-2021**
Caprolactum polymerizes to give:– **Nylon-6**	**HP CET-2018, NEET-2015**
Tetrafluorothene is the monomer of:– **Teflon**	**HP CET-2018**
The two monomers for the synthesis of nylon 6, 6 are– **$HOOC(CH_2)_4COOH,\ H_2N(CH_2)_6\ NH_2$**	**[JEE Main 2017]**
Bakelite is a cross-linked polymer of formaldehyde and– **Novolac**	**[JEE Main 2021, 20 July Shift-II]**
Nylon threads are made up of– **Polyamide polymer**	**JCECE-2008, UPTU/UPSEE-2007 [AIEEE 2003]**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

The structure of nylon-6 is– 	**[JEE Main 2019, 8 April Shift-II]**
The polymer containing strong intermolecular forces e.g. hydrogen bonding is– **Nyl**	**[AIEEE 2010]**
In polymer Buna-S: 'S' stands for– **Styrene**	**[JEE Main 2021, 24 Feb Shift –II]**
The process of formation of polymers from respective monomers is called– **Polymerisation**	**J & K CET-(2014)**
The polydispersity index of the polymer is always– **1 or > 1**	**JCECE – 2017**
The monomer used to produce orlon is– **$CH_2 = CHCN$**	**JCECE – 2017, WB JEE-2009**
The polymer containing five methylene groups in its repeating unit is– **nylon 6**	**Karnataka-CET-2019**
In Buna-S, the symbol Bu stands for– **butadiene**	**Karnataka-CET-2013**
The s-block element uses as a catalyst in the manufacture of Buna-S rubber is– **Na**	**Karnataka-CET-2012**
The monomers of buna-S rubber are– **styrene and butadiene**	**Karnataka-CET, 2008**
β-pleated sheets of polypeptide chains are present in– **secondary structure**	**MHT CET-02.05.2019, SHIFT-III**
The monomers used in preparation of dextron are– **lactic acid and glycolic acid**	**MHT CET-2017**
The natural rubber is the polymer of– **isoprene**	**MHT CET-2012**
Rayon is– **regenerated fibre**	**MHT CET-2008**
Terylene is the polyester of– **vinyl chloride and formaldehyde**	**MHT CET-2007**
Caprolactam is used for the manufacture of– **nylon 6**	**(NEET-2015)**
Teflon is a polymer of– **tetrafluoro ethylene**	**UP CPMT-2010**

Biodegradable Polymers

Poly-β-hydroxybutyrate-Co-β-hydroxyvalerate (PHBV) is a copolymer of.....– **3-hydroxybutanoic acid and 3-hydroxypentanoic acid**	**[JEE Main 2019, 12 Jan Shift-I] Assam CEE -2018**
Example of a biodegradable polymer pair is– **PHBV and dextron**	**AP EAMCET (Engg.) 2013**
Biodegradable polymer is– **PHBV**	**Assam CEE-2020**
A biodegradable polyamide can be made from– **Glycine and aminocaproic acid**	**[JEE Main 2021, 25 July Shift-II]**
The biodegradable polymer is– **nylon-2-nylon 6**	**(NEET 2019)**
The biodegradable polymer of polyamide class?– **Nylon-2-nylon-6**	**AP EAMCET (Engg.) 18.9.2020 Shift-I**
The polymer has 'chiral' monomer?– **PHBV**	**[JEE Main 2020, 9 Jan shift-II]**

Polymers of Commercial Importance

Conveyor belt is manufactured from– **neoprene**	**Kerala CEE -03.07.2022**
Ebonite is– **highly vulcanized rubber**	**COMEDK 2017, BITSAT-2007**
The hard plastic covers of telephones are made from polymers of– **phenol and formaldehyde**	**CG PET- 2016**
The polymer is used in the manufacture of wood laminates?– **Urea formaldehyde resin**	**[JEE Main 2021, 16 March Shift-II]**
A polymer commonly used as a packaging material is– **Polythene**	**UPTU/UPSEE-2016**
Hot drink cups are made up of– **PVC**	**SRMJEEE –2015, 2009**
Orlon fibres are made up of– **Polyacrylonitrile**	**[JEE Main 2021, 20 July Shift-I]**
Plexiglass is commercial name of– **polymethyl methacrylate**	**JCECE – 2017**
Novlac, the linear polymer used in paints is– **initial product obtained in the condensation of phenol and formaldehyde in the presence of acid catalyst**	**Kerala-CEE-2014**
The polymer used in making handles of cookers and frying pans is– **bakelite**	**MHT CET-2017**
A petrol pump hose pipe for delivery of petrol made up of– **butadiene rubber**	**UP CPMT-2009**
Synthetic human hair wigs are made from a copolymer of vinyl chloride and acrylonitrile and is called– **dynel**	**BCECE-2011**

Search on TG: @apna_pdf

@apna_pdf

29. Chemistry in Everyday Life

Drugs and their classification and therapeutic action of different classes of drugs:

- Some drugs bind to a site other than the active site of an enzyme. This site is known as– **Allosteric site**
- A chemical stimulates the secretion of pepsin is– **Histamine**
- The mixture of chloroxylenol and terpineol is an example of– **Antiseptic**
- Cationic detergent is a– **Cetyltrimethyl ammonium bromide**
- The functions of antihistamine are– **Antacid and antiallergic**
- The reason for "drug induced poisoning" is– **Binding at the allosteric sites of the enzyme**
- The narrow spectrum antibiotic is– **Penicillin G**
- Antihistamine is a– **Seldane**
- Bithional is an example of– **Antiseptic**
- The most useful classification of drugs for medicinal chemists is–**On the basis of molecular targets**
- Salvarsan is arsenic containing drug was first used for the treatment of– **Syphilis**
- A narrow spectrum antibiotic is active against– **Gram positive or gram negative bacteria**
- The use of chemicals for treatment of diseases is called– **Chemotherapy**
- Some drugs do not bind to the enzyme's active site, instead bind to a different site of enzyme. This site is called– **Allosteric site**
- Drugs that bind to the receptor site and inhibit its natural function are called– **Antagonistic drugs**
- The main cause of acidity in the stomach is– **Release of extra gastric acids which decrease the pH level**
- The drugs which are given to the patients suffering from anxiety and mental tension are known as– **Tranquilizers**
- The scientific explanation of depression is– **Low levels of noradrenaline, a neurotransmitter in the blood leads to depression**
- Barbituric acid and its derivatives are well known as– **Tranquilizers**
- Barbiturates acts as– **Hypnotic i.e., sleep producing agents**
- The chemical substances used to bring down body temperature in high fever are known as– **Antipyretics**
- Narcotic analgesic is a– **Morphine**
- A drug acts as antipyretic as well as analgesic is– **4-acetamidophenol**
- The antibiotic which is effective against certain strains of cancer cells is– **Dysidazirine**
- A drug is effective in curing malaria is– **Quinine**
- An ester is used as a medicine– **Methyl salicylate**
- The antibiotics that is bactericidal– **Penicillin**
- Drugs which contain mixture of norethindrone and ethynylestradiol are– **Antifertility**
- Salvarsan is an antimicrobial agent which is used for curing– **Syphilis**
- Antacids include– **Omeparazole, Lansoprazole, Sodium bicarbonate**
- Drugs can be classified on the basis of– **Pharmacological effect, Drug action, Chemical structure**
- Drawback of excess of hydrogen carbonate taking as antacid is– **It can make stomach alkaline and trigger the production of even more acid**
- Tranquilizers are prescribed for curing– **Anxiety, stress, irritability**
- Chemotherapy is– **Use of Chemical for therapeutic effect**
- Enzyme catalyst the reaction– **By holding the substrate molecule for chemical reaction and By providing the functional groups which will attack the substrate to carry out chemical reaction**
- Drugs which interface with natural action of histamine by competing with histamine are called– **Antihistamine**
- Barbituric acid and its derivates constitutes an important class– **Tranquilizers**

TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

- The first antibiotic was pencilin and was discovered by ..... **Alexander Fleming**
- Bacteriostatic drugs work by– **Arresting the growth of organisms**
- One of the most widely used drugs in medicine iodex is– **Methyl salicylate**
- The most useful classification of drugs for medicinal chemists is–**On the basis of molecular targets**
- A narrow spectrum antibiotic is active against– **Gram positive or gram negative bacteria**
- The compound that causes general antidepressant action on the central nervous system belongs to the class of– **Tranquilizers**
- The drug used to get relief from pain are called– **Analgesics**
- Sulpha drugs are derivatives of– **Sulphanilamide**
- Anti - allergy drugs are called– **Antihistamines**
- The use of chemicals for treatment of diseases is called– **Chemotherapy**
- A drug which is effective in curing malaria is– **Chloroquine**
- Broad spectrum antibiotic drug– **Chloramphenicol**
- A substance which can act both as an analgesic and antipyretic is– **Aspirin**
- Bacteriostatic drug is a– **Tetracycline**
- The chemical that stimulates the secretion of pepsin & Hydrochloric acid– **Histamine**
- Tranquilizers are also known as– **Psychotherapeutic drugs**
- ..... is used as an antibiotics– **Ofloxacin**
- ..... is employed as a tranquilizer– **Equanil**
- Paracetamol is an– **Analgesic, Antipyretic**
- Drugs can be classified on the basis of– **Drug action, Chemical structure, Pharmocological effect**
- Types of drugs reduces fever– **Antipyretics**
- Iproniazid is used as– **Antidepressant**
- The main constituents of dettol are– **Chloroxylenol and terpineol**
- Barbiturates acts as– **Hypnotic, i.e., sleep producing agent**
- Ethynylestradiol drug is used– **In the birth control**
- Salvarsan is an arsenic containing drug which was first used for the treatment of– **Syphilis**
- Phenol is used as– **An antiseptic, A disinfectant**
- The drug given during hypertension is– **Equanil**
- Hypnotic drug is a– **Luminal**
- The substances which effect the central nervous system and induce sleep are known as– **Tranquilizers**
- An antibiotic contains nitro group attached to aromatic nucleus. It is– **Chloramphenicol**
- Pain killing means– **Analgesic**
- Derivatives of barbituric acid is– **Veronal, Luminal, Nembutal**
- Morphine narcotics are sometimes referred to as– **Opiates**
- Tincture of iodine is– **2-3 percent solution of iodine in alcohol-water mixture**
- Saccharin, an artificial sweetener, is manufactured from– **Toluene**
- ..... is used as an antioxidant in food– **BHT**
- Name an artificial sweetener which is derivative of sucrose– **Sucralose**
- Refrigeration helps in food preservation by– **Reducing the rates of biochemical reaction**

Chemicals in foods, food preservatives and antioxidants

- An artificial sweetener is derivative of sucrose is– **Sucralose**
- Aspartame, the artificial sweetener is made by a dipeptide of the amino acids– **Aspartic acid and phenylalanine**
- The use of aspartame is limited to cold foods and drinks because– **It is unstable to heat and decomposes at cooking temperature**
- The sweeteners value of aspartame in comparison to cane sugar is– **100**
- An antioxidant is added to butter to increase its shelf life from months to years is– **Butylated hydroxy anisole**
- Chemicals are added to food for– **Preservation, Enhancing their appeal, Adding nutritive value**
- The first popular artificial sweetening agent is– **Saccharin**
- The main disadvantage associated with use of aspartame is– **It is unstable at cooking temperature**
- ..... can be used as food preservative– **Vegetable oil, Table Salt, Sodium benzoate**
- The maximum high potency sugar is– **Alitame**
- Sweetest artificial sweetener– **Alitame**
- Artificial sweetener which is stable under cold conditions only is– **Aspartame**
- The chemicals that can be added for sweetening of food items at cooking temperature and does not provide calories– **Sucralose**
- The narrow spectrum antibiotic is– **Penicillin G**
- The compound used as a preservative for food products such as tomato ketchup & fruit juice– **Sodium benzoate**

Search on TG: @apna_pdf

@apna_pdf

- The use of aspartame is limited to cold foods and drinks because– **It is unstable to heat and decomposes at cooking temperature**
- Aspartame, the artificial sweetener is made by a dipeptide of amino acids– **Aspartic acid & phenyl alanine**
- Ortho-sulphobenzimide, an artificial sweetener is commonly known as– **Sachharin**
- The artificial sweetener that is excreted from the body in urine unchanged– **Saccharin**

Cleansing agents

- The compound that causes general antidepressant action on the central nervous system belongs to the class of– **Tranquilizers**
- Compound which is added to soap to impart antiseptic properties is– **Bithional**
- Glycerol is added to soap. It functions– **To prevent rapid drying**
- Polythylene glycols are used in the preparation of type of detergents– **Non-ionic detergents**
- The main difference between bathing and washing soap is– **Bathing soaps are potassium salts of fatty acids while washing soaps are sodium salts of fatty acids**
- Soaps do not work in hard water containing calcium and magnesium ions because– **Ca^{2+} and Mg^{2+} ions form insoluble calcium and magnesium salts in the form of scum**
- Broad spectrum antibiotic is a– **Chloramphenicol**
- Tincture of iodine is– **2-3% solution of iodine in alcohol-water mixture**
- The main constituents of dettol are– **Chloroxylenol and terpineol**
- Soaps are sodium or potassium salt of long chain fatty acids like–**Palmitic acid, Oleic acid, Stearic acid**
- Soaps which are made by dissolving the soap in ethanol and then evaporating the excess solvent– **Transparent soap**
- The fillers that can be present in laundary soap is– **Sodium rosinate, Borax and Sodium silicate**
- Soap powders and scouring soap contains builders like– **Trisodium phosphate, Finely divided sand and Powdered pumice**
- Soaps on reaction with hard water forms insoluble scum due to the formation of– **$(C_{17}H_{33}COO)_2Ca$**
- ..... are preferably used in liquid dish washing– **Non-ionic detergent**
- Biodegradable detergent should have– **Normal unbranched side chain**
- Non-ionic detergents are– **Esters**
- 0.2% of solution of phenol and 0.2-0.4 ppm chlorine in aqueous solution respectively behave as– **Antiseptic, Disinfectant**
- Birth control pills essentially contains– **Synthetic estrogen, Synthetic progesterone**
- Major point of difference between antiseptic and disinfectant is– **Disinfectant are not safe to be applied to living tissues**
- 1% phenol acts as– **Disinfectant**
- Chemical compounds used for releasing stress are– **Tranquilizer**
- Bithional is generally added to the soaps as an additive to function as– **An antiseptic**
- Chloroamphenicol is an– **Antibiotic-broad spectrum**
- The ..... is employed as Antihistamine– **Diphenyl hydramine**
- The ..... is employed as a Tranquilizer drug– **Valium**
- The ..... is employed as a Tranquilizer– **Equanil**
- Tincture of iodine is– **2-3% Iodine solution in alcohol-water**
- Antiseptic which is a mixture of chloroxylenol and α-terpineoul is– **Dettol**
- Compound is added to soap to impart antiseptic properties is– **Bithional**
- Enhances the lathering property of soap– **Sodium rosinate**
- Glycerol is added to soap. It functions– **To prevent rapid drying**
- Anionic detergent is a– **$CH_3(CH_2)_{10}CH_2OSO_3Na$**
- Detergents are prepared by the action of H_2SO_4 followed by neutralization by starting with– **Lauryl alcohol**
- Polyethyleneglycols are used in the preparation of which type of detergents– **Non-ionic detergents**
- The process that will give soap– **Saponification**
- Hydrolytic reaction of fats with caustic soda is known as– **Saponification**
- Soap is– **$C_{17}H_{35}COONa$**
- Scouring soaps and soap powder contain soap along with– **Powdered pumice**
- Structurally biodegradable detergent should contain– **Linear alkyl chain**
- Bactericidal is– **Ofloxacin**
- The artificial sweetener containing chlorine that has the appearance and taste as that of sugar and is stable at cooking temperature is– **Sucralose**
- Preservatives are– **Sodium benzoate, Sodium metabisulphite ($Na_2S_2O_5$)**
- Narcotic analgesic is a– **Heroin**
- ..... are used as antacids– **Sodium hydrogen carbonate, Magnesium hydroxide**

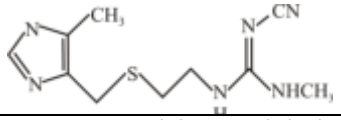
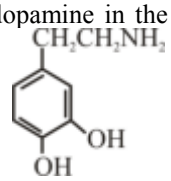
TEAM SPY

Search on TG: @apna_pdf

@apna_pdf

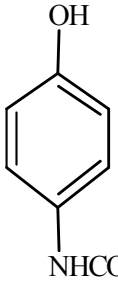
EXAM POINT

Drugs and their classification and therapeutic action of different classes of drugs

Some drugs bind to a site other than, the active site of an enzyme. This site is known as– **allosteric site**	**JEE Main 25.07.2022, Shift-II**
The eutrophication of water body results in:– **Loss of Biodiversity**	**JEE Main-25.06.2022, Shift-I**
The primary precursor of photochemical smog that can be metabolized by plants such as Juniparus and Pyrus, is– **nitrogen dioxide**	**Kerala CEE -03.07.2022**
The drug tagamet is :– 	**JEE Main-28.06.2022, Shift-II**
Ofloxacin is a/an– **Bactericidal antibiotic**	**Assam-CEE-31.07.2022**
A broad spectrum antibiotic is– **Chloramphenicol**	**JHARKHAND – 2019**
The reactants is used for preparation of paracetamol from phenol?–**HNO_3 , H_2/Pd,**	**VITEEE-2015**
A drug that commonly causes oral candidiasis is– **antibiotics**	**SRMJEEE – 2015**
An antitumor drug is– **Cis-$[Pt(NH_3)_2Cl_2]$**	**SRMJEEE – 2010**
The drug used as post operative analgesic in medicine is :– **morphine**	**AP EAMCET (Engg.) 2015**
Aspirin is acetyl salicylic acid, the pair of functional groups present in the compound is– **Carboxylic acid, ester**	**AP- EAMCET(Medical) - 2010 CG PET-2011**
Helium mixed with oxygen is used in the treatment of– **asthma**	**AP EAMCET- (Engg.) - 2010**
Examples for bactericidal and bacteriostatic antibiotics, respectively are– **pencillin, chloramphenicol**	**AP EAMCET (Engg.) 17.09.2020 Shift-I**
Parkinson's disease is linked to abnormalities in the levels of dopamine in the body. The structure of dopamine is– 	**AP EAMCET (Engg.)-2009**
Arsenic drugs are mainly used in the treatment of– **syphilis**	**(AIIMS-1998, 2013) BCECE - 2011**
A broad spectrum antibiotic is– **chloramphenicol**	**(AIIMS-2014)**
The antibiotic that contains arsenic is– **salvarsan**	**AMU-2016**
Mammals' fats are hydrolysed to release fatty acids by– **lipase**	**AMU – 2009**
Amphetamine is used as– **antidepressant**	**AMU-2005**
Bacteriostatic antibiotics is– **Oflaxacin**	**Assam CEE-2020**
Chemically aspirin is known as– **2-acetoxybenzoic acid**	**BCECE-2007**
Paracetamol is an:– **antipyretic**	**CG PET- 2015 Karnataka-CET-2007 BCECE-2004**
Blood cells do not shrink in blood because blood is– **isotonic**	**BCECE-2008**
Aspirin is– **antipyretic**	**BCECE-2009 JIPMER-2006**
A substance which can act both as an antiseptic and disinfectant is– **phenol**	**BCECE-2016**
Substances used in bringing down the body temperature in high fever is called– **antipyretics**	**BCECE-2017**
Bithional is generally added to the soaps as an additive to function as a/an:– **Antiseptic**	**[BITSAT-2008]**
Cobalt (60) isotope is used in the treatment of:– **Cancer**	**[BITSAT-2015]**
Arsenic containing medicine used for the treatment of syphilis, is– **salvarsan**	**[BITSAT-2021]**
Drugs are the chemicals with– **low molecular masses**	**CG PET- 2016**
Cetyltrimethyl ammonium bromide (CTAB) is popular as– **surfactant**	**CG PET- 2012**
Noradrenaline is a/an– **neurotransmitter**	**[JEE Main 2019, 9 April**

Search on TG: @apna_pdf

@apna_pdf

	Shift-II]
The antifertility drug "Novestrol" can react with :– **Br_2/water; $ZnCl_2$/HCl; $FeCl_3$**	**[JEE Main 2020, 3 Sep Shift-I]**
The mechanism of action of 'Terfenadine' (Seldane) is :– **Inhibits the action of histamine receptor**	**[JEE Main 2020, 4 Sep Shift-II]**
A bactericidal drug is– **Penicillin**	**J & K CET-(2016)**
Use of chemicals for therapeutic effect is called– **chemotherapy**	**J & K CET-(2014)**
The bacteriostatic antibiotic is– **erythromycin**	**J & K CET-(2009)**
The class of drugs used for the treatment of stress is– **tranquillizers**	**J & K CET-(2010)**
Barbituric acid and its derivatives are well known as:– **Tranquilizers**	**JCECE - 2005**
Penicillin is– **antibiotic**	**JCECE - 2007**
Tranquillisers are the substances used for the treatment of– **mental diseases**	**JCECE - 2014**
Deficiency of Vitamin-B_6 causes– **convulsions**	**JCECE - 2018**
Hypothyroidism is caused by the deficiency of– **thyroxine**	**Karnataka-CET-2020**
Hormones are secreted by ductless glands of human body.– **Thyroxine**	**Karnataka-CET-2017**
Cheildosis and digestive disorders are due to the deficiency of– **riboflavin**	**Karnataka-CET-2015**
The disease kalaazar is cured by– **colloidal antimony**	**Kerala-CEE-2012**
The chelating ligand used to remove excess of copper and iron in chelate therapy is– **D-penicillamine**	**Kerala-CEE-2015**
Narcotic analgesic is– **codeine**	**Kerala-CEE-2016**
Phenol is a highly corrosive substance, but it 0.2 percent solution is used as– **Antiseptic**	**Kerala-CEE-2017**
Barbiturates are potent– **hypnotics**	**Kerala-CEE-2018**
The antimicrobial drug that contains arsenic is– **Salvarsan**	**Kerala-CEE-2020**
Acetyl salicylic acid is used as:– **analgesic drug**	**Manipal-2019**
Veronal is used as a/an– **tranquilizer**	**MHT CET-02.05.2019, SHIFT-II**
Bactericidal antibiotic is– **ofloxacin**	**MHT CET-2011**
The isotope that causes skin disease is– **S^{35}**	**MHT CET-2010**
Antipyretics are used to– **bring down body temperature**	**MHT CET-2009**
Tranquilisers are also known as– **psychoterapeutic drugs**	**MHT CET-2008**
Aspirin is an acelytation product of– **o-hydroxybenzoic acid**	**MHT CET-2008, (AIPMT - 1998)**
Calamine is– **$ZnCO_3$**	**MHT CET-2008**
Chloramine-T is a– **antiseptic**	**MHT CET-2008**
Chloroamphenicol is an– **antibiotic-broad spectrum**	**(AIPMT -Mains 2012)**
The narrow spectrum antibiotic is– **penicillin G**	**(NEET 2019)**
Mixture of chloroxylenol and terpineol acts as– **antiseptic**	**(NEET 2017)**
An antibiotic effective in treatment of pneumonia, bronchitis etc. is– **chloromycetin**	**UP CPMT-2014**
The chemical name of aspirin is– **acetyl salicylic acid**	**BCECE-2018, (AIEEE 2012), UP CPMT-2010 WBJEE-2010**
The deficiency of iodine in diet causes:– **goitre**	**UPTU/UPSEE-2006**
The reagent (s) used in the preparation of aspirin from salicylic acid– **$(CH_3CO)_2O$, H^+**	**UPTU/UPSEE-2012 BCECE-2017**
The drug used to bring down fever are known as– **antipyretic**	**UPTU/UPSEE-2008**
Paracetamol is– **N- acetyl-p-amino phenol**	**WB-JEE-2011**
The correct structure of the drug paracetamol is– 	**WB-JEE-2016**

JEAM SIR

Search on TG: @apna_pdf

@apna_pdf

Chemicals in foods, food preservatives and antioxidants

The presence of soluble fluoride ion upto 1 ppm concentration in drinking water, is :–	**Safe for teeth**	**[JEE Main 2020, 6 Sep Shift-I]**
Chloroxylenol is an example of ..... .–	**antiseptic**	**TS-EAMCET-2016**
Benzene 4-hydroxy acetanilide belongs to -	**Antipyretic**	**AP EAMCET (Engg.) 2012**
2-Acetoxy benzoic acid is used as an–	**antipyretic**	**COMEDK 2019**
The functions of antihistamine are:–	**Antacid and antiallergic**	**JEE Main 16.03.2021, Shift-I**
Phenacetin is an example of–	**antipyretic**	**CG PET -2018**
Salts of sorbic acid and propionic acid are used as–	**food preservatives**	**Kerala-CEE-2011**
A food additive that acts as an antioxidant is–	**BHA**	**Karnataka-CET-2020**
Butylated hydroxy anisole is a/an–	**antioxidant**	**MHT CET-2016**
The artificial sweetner stable at cooking temperature and does not provide calories is–	**sucralose**	**(Odisha NEET 2019)**

Cleansing agents

An example of anionic detergent is.–	**Sodium dodecylbenzene sulphonate**	**Assam-CEE-31.07.2022**
The cationic detergent?–	**Cetyltrimethyl ammonium bromide**	**JHARKHAND – 2019**
Potassium soaps are–	**soft soaps**	**SRMJEEE – 2014**
A micelle formed during the cleansing action by soap is–	**aggregated particles of soap and dirt**	**AP EAMCET- (Engg.) - 2010**
The formula of Calgon, used for water softening is–	**$Na_2[Na_4(PO_3)_6]$**	**AP - EAMCET (Medsssssical) - 2007**
In general, for soaps, the concentration of surface at CMC is around ——— $mol.L^{-1}$–	**10^{-4} to 10^{-3}**	**AP EAPCET 25.08.2021, Shift-II**
Sodium rosinate is generally added in the soap because it–	**produces rich lather**	**COMEDK 2015**
Detergents can be made biodegradable and pollution free by–	**using unbranched hydrocarbon chain**	**COMEDK 2015**
Synthetic detergents are more effective in hard water than soaps because–	**their Ca^{2+} and Mg^{2+} salts are water soluble.**	**(AIIMS-2009)**
2, 4- Dichlorophenoxyacetic acid is used as–	**Herbicide**	**[BITSAT-2012]**
Cetyltrimethyl ammonium bromide is a popular–	**cationic detergent**	**[BITSAT-2021] [Kerla CEE-2010]**
Green chemistry in day-to-day life is in the use of:–	**Liquified CO_2 for dry cleaning of clothes.**	**[JEE Main 2021, 20 July Shift-I]**
Glycerol is separated in soap industries by–	**distillation under reduced pressure**	**[JEE Main 2020, 3 Sep Shift-I]**
At high concentration of soap in water, soap behave as–	**associated colloid**	**JCECE - 2013**
Lauryl alcohol on treatment with H_2SO_4 followed by neutralization forms a product which is–	**anionic detergent**	**sss**
The reaction of benzenediazonium chloride with aniline yields yellow dye. The name of the yellow dye is–	**p-aminoazobenzene**	**Karnataka-CET-2018**
Bithional is added to soap as an additive to function as a/an–	**antiseptic**	**Kerala-CEE-2009**
Potassium stearate is obtained by the saponificaiton of an oil or fat. It has the formula $CH_3 - (CH_2)_{16} - COO^-K^+$. The molecule has a lyophobic end [CH_3] and a lyophilic end COO^-K^+. Potassium stearate is an example for :–	**associated collosssid or micelle**	**Kerala-CEE-2005**
The cationic detergent that is used in hair conditioners is–	**cetyltrimethyl ammonium bromide**	**Kerala-CEE-2011**
Soaps are the sodium or potassium salts of higher fatty acids, containing number of carbon atoms more than,–	**12**	**MHT CET-03.05.2019, SHIFT-I**
Bithional is generally added to the soaps as an additive to function as a/an–	**antiseptic**	**(NEET-2020 Cancelled)**
An anionic detergent?–	**Sodium lauryl sulphate**	**CG PET-22.05.2022**
Dettol is the mixture of–	**chloroxylenol and terpineol**	**AIIMS-27.05.2018 (E) COMEDK 2013 (Karnataka NEET 2013)**

Search on TG: @apna_pdf

@apna_pdf

30. Nuclear Chemistry

- The nucleus of helium contains– **Two neutrons and two protons**
- Neutrons are present in all atoms except– **H**
- An isotope of $^{112}_{50}Sn$ contains 68 neutrons, its mass number is– **118**
- As we move away from nucleus, the energy of orbit– **Increases**
- Total neutrons are there in $^{88}_{38}Sr$ – **50**
- The cause of instability of nucleus is– **Low proton to neutron ratio**
- A stable nucleus (light with A < 10) has– **exactly the same number of neutrons and protons**
- Deuterium nucleus contains– **1 proton, 1 neutron**
- Nuclides– **Have specific atomic number and mass numbers**
- Number of neutron in C^{12} is– **6**
- Neutron is a fundamental particle carrying– **No charge and a mass of one unit**
- Neutron is discovered by– **Chadwick**

EXAM POINT

The radiation with maximum penetration power is– **γ-rays**	**J & K CET-(2002) MHT CET-2008**
For n^{th} order of reaction, Half-life period is directly proportional to– $\frac{1}{a^{n-1}}$	**Karnataka CET-17.06.2022, Shift-II**
The compound used as a moderator in nuclear reactors is– **D_2O**	**TS-EAMCET (Engg.), 06.08.2021**
Television picture tubes are– **cathode-ray tubes**	**AMU-2015**
An isobaric product is formed if radioactivity proceeds by emission of– **one β-particle**	**SCRA-2012**
Radioactivity was discovered by– **Henri Becquerel**	**SRMJEEE – 2011**
Highest ionising power is exhibited by– **α-rays**	**BCECE-2008**
The relationship between parent and daughter nuclei when a nucleus of an atom undergoes beta emission is– **Isobars**	**J & K CET-(2010)**
The β-decay of a radioactive element results in the formation of its– **isobar**	**J & K CET-(2009)**
Loss of a beta particle is equivalent to– **decrease of one neutron only**	**J & K CET-(2005)**
n/p ratio during positron decay – **increases**	**Manipal-2020**
Unit of decay constant of radioactive disintegration is– **$time^{-1}$**	**MHT CET-2011**
Half-life of a radioactive element is– $\frac{0.693}{k}$	**UP CPMT-2005**
Nuclides having equal number of neutrons but differing in mass numbers and atomic numbers are called– **isotones**	**AP EAMCET-1995, 1992**
Most common isotopes of hydrogen (non-radioactive) is– **protium**	**JIPMER-2019**
Radioactive isotope of hydrogen is– **tritium**	**UP CPMT-2012**
The radiant energy from the sun is due to– **nuclear fusion**	**UPTU/UPSEE-2006**

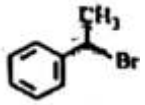
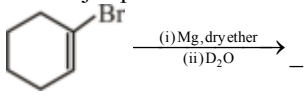
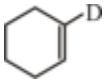
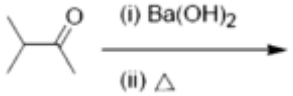
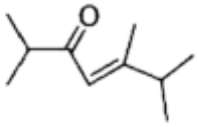
TEAM SOY

Search on TG: @apna_pdf
@apna_pdf

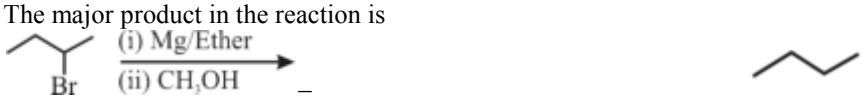
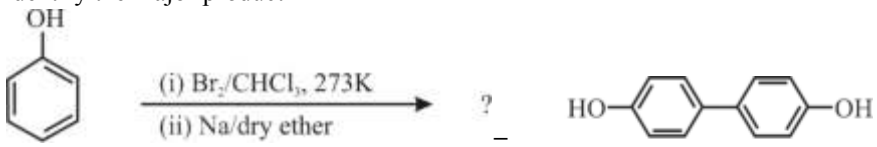
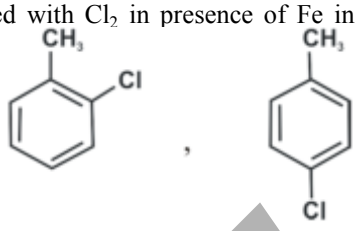
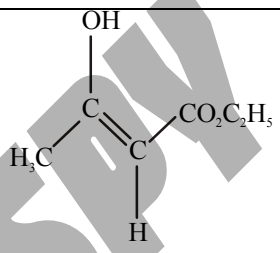
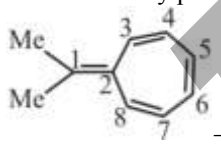
31. Reaction Mechanism

- The most stable free radical– $CH_3\dot{C}HC_6H_5$
- The catalyst is best for single step conversion of CH_4 into formaldehyde?– **Mo_2O_3/Δ**
- Bromination of alkane is initiated by a process of– **Homolysis**
- The order of reactivity of hydrogen atoms attached to carbon atom in an alkene– **$3^\circ > 2^\circ > 1^\circ$**
- The ease of dehydrohalogenation for different halogens is in the order– **iodide > bromide > chloride**
- Lindlar's catalyst is used for controlled– **Hydrogenation**
- The correct trend of acidic nature of the alkynes is– **$CH \equiv CH > CH_3 - C \equiv CH > CH_3C \equiv CCH_3$**
- Nitration and chlorination of benzene are– **Electrophilic substitution in both the reactions**
- In electrophilic aromatic substitution reaction, the nitro group is meta directing because it– **Decreases electron density at ortho and para positions**
- The correct order of reactivity towards electrophilic substitution is– **Phenol > benzene > chlorobenzene > benzoic acid**
- Benzene undergo substitution reaction more easily than addition because– **Of delocalization of π-electrons**
- The reactive species in the nitration of benzene is– **NO_2^+**
- Electrophile in the case of chlorination of benzene in the presence of $FeCl_3$ is– **Cl^+**
- The addition of propene with HOCl proceeds via the addition of– **Cl^+ in the first step**
- Aryl halides are less reactive towards nucleophilic substitution reactions as compared to alkyl halides due to– **Resonance stabilisation in aryl halides**
- A primary alkyl halide would prefer to undergo– **S_N2 reaction**
- Bond length of phenol is less than the alcohol because– **–R effect of –Ph ring**
- The reaction between phenol and chloroform in the presence of aqueous NaOH is– **Electrophilic substitution reaction**
- The correct sequence of decreasing acidity is– **$CH_3OH > C_2H_5OH > (CH_3)_2CHOH > (CH_3)_3COH$**
- A strong base can abstract an α-hydrogen from– **Ketone**
- Carboxylic acids dimerise due to– **Intermolecular hydrogen bonding**
- The correct order of relative strength of acids is– **$FCH_2COOH > ClCH_2COOH > BrCH_2COOH$**

EXAM POINT

The compound that will undergo S_N1 reaction with the fastest rate is 	**NEET-05.05.2024**
$RMgX + CO_2 \xrightarrow[\text{ether}]{\text{dry}} Y \xrightarrow{H_3O^+} RCOOH$ What is Y in the above reaction?– **$RCOO^-Mg^+X$**	**NEET-17.06.2022**
The major product of the following reaction is  	**AP-EAMCET-04.07.2022, Shift-II**
Identify the major product in the reaction  	**AP-EAPCET-12.07.2022, Shift-II**

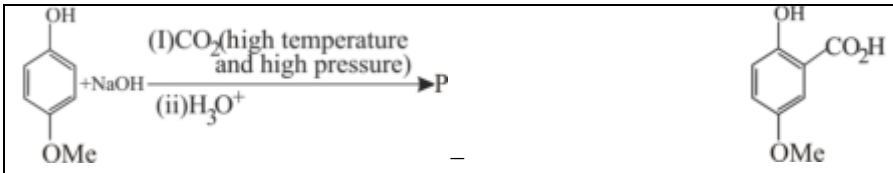
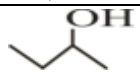
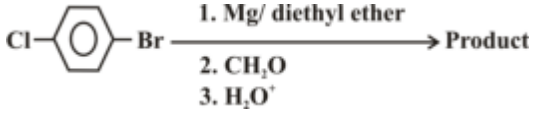
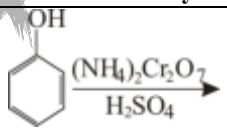
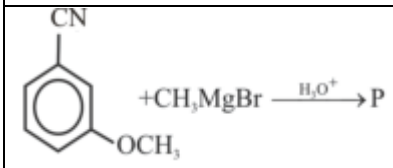
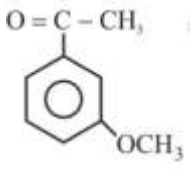
Search on TG: @apna_pdf
@apna_pdf

The major product in the reaction is 	**AP-EAPCET-12.07.2022, Shift-II**
Identify the major product- 	**AP-EAPCET-12.07.2022, Shift-II**
The product (s) formed when toluene is reacted with Cl_2 in presence of Fe in dark is/are– 	**AP-EAMCET-08.07.2022, Shift-I**
The enol form in which ethyl-3-oxobutanoate exists is– 	**WB-JEE-30.04.2022**
Benzoylation of phenol in alkaline medium is known as– **Schotten-Baumann reaction**	**WB-JEE-2008**
$X \xrightarrow{PCl_5} C_2H_5Cl$, $Y \xrightarrow{PCl_5} CH_3COCl$ X and Y are.– **C_2H_5OH and CH_3CO_2H**	**WB-JEE-2010**
Under identical conditions the S_N1 reaction will occur most efficiently with– **tert-butyl chloride**	**WB-JEE-2012**
Upon treatment with $Al(OEt)_3$ followed by usual reactions (work up), CH_3CHO will produce– **only $CH_3COOCH_2CH_3$**	**WB-JEE-2012**
The most likely protonation site in the following molecule is  – **C-1**	**WB-JEE-2014**
In the reaction $R\,MgBr + HC(OEt)_3 \xrightarrow{Ether,\ H_3O^+} P$, The product P is– **RCHO**	**WB-JEE-2015**
1,4-dimethylbenzene on heating anhydrous $AlCl_3$ and HCl produces– **1, 3-dimethylbenzene**	**WB-JEE-2015**
The major product(s) obtained from the following reaction of 1 mole of hexad euteriobenzene is /are –	**WB-JEE-2017**
The structure of product P of the following reaction is -	**WB-JEE-2017**

TEAM SPY

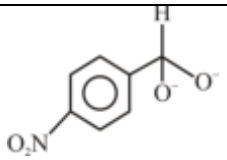
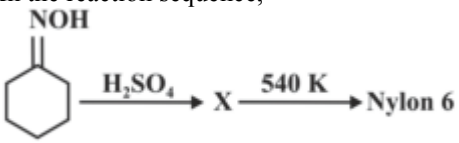
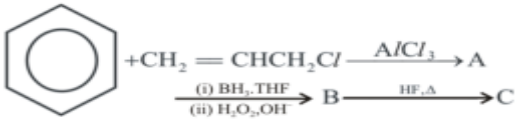
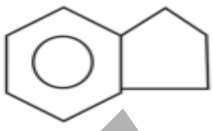
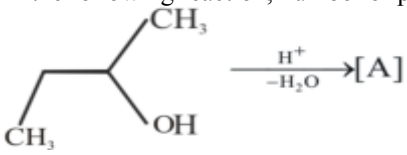
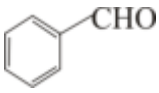
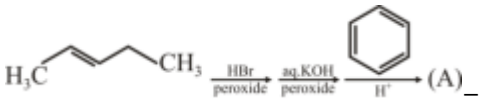
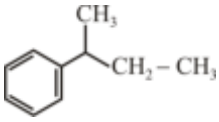
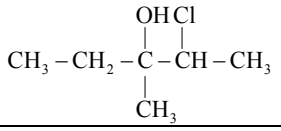
Search on TG: @apna_pdf

@apna_pdf

 –	
$[P] \xrightarrow{Br_2} C_2H_4Br_2 \xrightarrow[NH_3]{NaNH_2} [Q]$ $[Q] \xrightarrow[Hg^{2+},\Delta]{20\%H_2SO_4} [R] \xrightarrow{Zn\text{-}Hg/HCl} [S]$ The species P, Q, R and S respectively are– **ethene, ethyne, ethanal, ethane**	**WB-JEE-2018**
$C_4H_{10}O \xrightarrow[H_2SO_4]{K_2Cr_2O_7} C_4H_8O \xrightarrow[Warm]{I_2/NaOH} CHI_3$ Here, N is– 	**WB-JEE-2018**
The compound, which evolves carbon dioxide on treatment with aqueous solution of sodium bicarbonate at 25°C, is– **CH_3COCl**	**WB-JEE-2019**
 The product in the above reaction is–	**WB-JEE-2020**
$2Ph-CDO \xrightarrow[Warm]{50\%aq.NaOH} Ph-COOH +$ an alcohol . This alcohol is– **$Ph-CD_2-OH$**	**WB-JEE-2020**
In the reaction, $RNH_2 \xrightarrow{HNO_2} A+B+C\uparrow$; C is : – **$N_2$**	**UPTU/UPSEE-2006**
In the reaction: $CH_3OH \xrightarrow{oxidation} A \xrightarrow{NH_3} B$; A and B are : – **$HCOOH, HCOONH_4$**	**UPTU/UPSEE-2006**
In the reaction: $A \xrightarrow[H_2SO_4]{K_2Cr_2O_7} acetone \xrightarrow{oxidation} acetic\ acid$, A is :– **2-propanol**	**UPTU/UPSEE-2006**
Cordite is a mixture of– **Nitroglycerine, guncotton and vaseline**	**UPTU/UPSEE-2018**
The benzene is converted into n-propyl benzene by– **Friedel-crafts acylation followed by Clemmensen reduction**	**UPTU/UPSEE-2018**
The product in the following reaction  **Benzoquinone**	**UPTU/UPSEE-2017**
The name of the following reaction is $HCHO + HCHO \xrightarrow[\Delta]{NaOH} CH_3OH + HCOONa$ – **Cannizzaro reaction**	**UPTU/UPSEE-2017**
 Product P in the above reaction is– 	**UPTU/UPSEE-2016**
Petroleum is obtained from water gas, name of the reaction involved is– **Fischer-Tropsch**	**UPTU/UPSEE-2015**
Benzaldehyde reacts with CH_3NH_2 forming– **Schiff's base**	**UPTU/UPSEE-2015**
In a Cannizzaro reaction, the intermediate that will be least hydride donor is–	**UPTU/UPSEE-2014**

Search on TG: @apna_pdf

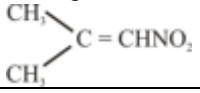
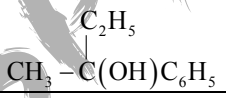
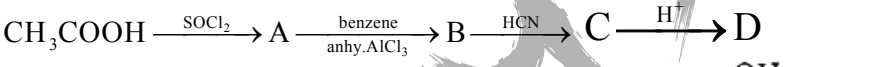
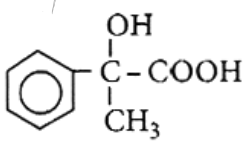
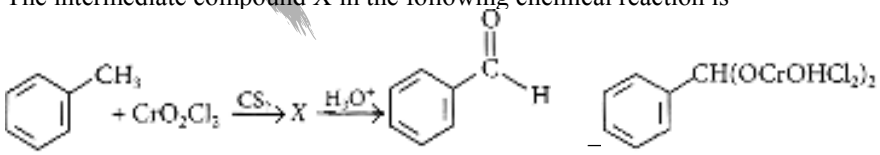
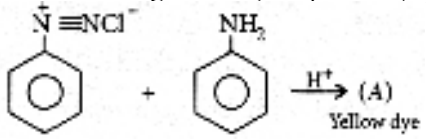
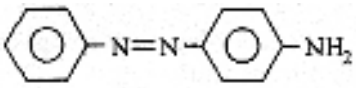
@apna_pdf

	
In the reaction sequence,  X is – **Caprolactum**	**UPTU/UPSEE-2013**
The end product 'C' in the following reaction  – 	**UPTU/UPSEE-2012**
In the following reaction, number of possible structure is  – **5**	**UPTU/UPSEE-2012**
Cannizzaro as well as aldol condensation reaction is given by– **2-methylpropanal**	**UPTU/UPSEE-2010**
The product when nitrobenzene is treated sequentially with (i) NH_4Cl/Zn dust and (ii) H_2SO_4 / $Na_2Cr_2O_7$ – **Nitrosobenzene**	**UPTU/UPSEE-2010** **WBJEE-2010**
Friedel-Craft's acylation reaction involves– **Electrophilic substitution**	**UPTU/UPSEE-2010**
Hydride ion transfer takes place in– **Cannizzaro's reaction**	**AMU-2013** **UPTU/UPSEE-2009**
Phenol on treatment with diethyl sulphate in presence of NaOH gives– **phenetole**	**UPTU/UPSEE-2009**
Cannizzaro reaction is performed by– **formaldehyde and benzaldehyde**	**UPTU/UPSEE-2009**
A solution of sodium thiosulphate on addition of few drops of ferric chloride gives violet colour due to the formation of– **$Fe_2(S_2O_3)_3$**	**UPTU/UPSEE-2008**
In the following reaction $RCH_2COOH \xrightarrow{Br_2/P} X \xrightarrow{\text{excess } NH_3} Y$ The major amounts of X and Y are– **RCHBrCOOH ; $RCH(NH_2)COOH$**	**UPTU/UPSEE-2008**
The reactant (X) in the reaction. (X) $\xrightarrow[(CH_3CO)_2O]{CH_3COONa}$ Cinnamic acid is – 	**UPTU/UPSEE-2008**
Cannizzaro reaction is given by– **C_6H_5CHO**	**UP CPMT-2014**
Identify A in the given sequence of reaction  – 	**UP CPMT-2013**
3-methyl-2-pentene on reaction with HOCl gives– 	**UP CPMT-2013**
Ozonolysis of cyclo butene gives– **butane 1, 4-dial**	**UP CPMT-2013**
Toluene by Etard's reaction gives– **benzaldehyde**	**UP CPMT-2012**
Sodium phenoxide reacts with CO_2 at 400K and 4.7 atm pressure to give– **sodium salicylate**	**UP CPMT-2012**

TEAM SPY

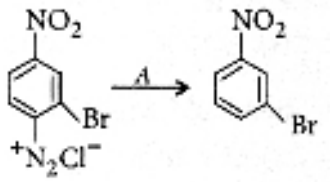
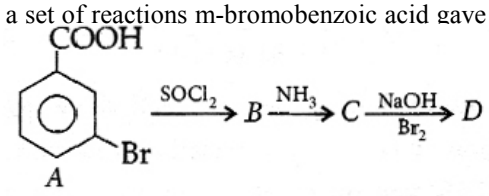
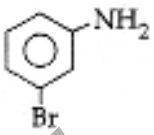
Search on TG: @apna_pdf

@apna_pdf

The raw material for Raschig process is– **chlorobenzene**	**UP CPMT-2012**
An organic compound of molecular formula $C_4H_{10}O$ does not react with sodium. With excess of HI, it gives only one type of alkyl halide. The compound is– **ethoxyethane**	**UP CPMT-2012**
The product formed when acetone is reacted with nitromethane in the presence of a base is– 	**UP CPMT-2011**
An organic compound with molecular formula, C_7H_8O when dissolved in NaOH gives a characteristic colour with $FeCl_3$. On treatment with bromine, it gives a tribromoderivative, $C_7H_5OBr_3$. The compound is– **m-cresol**	**UP CPMT-2011**
When CH_3CONH_2 is heated with P_2O_5 the product is– **CCl_3CONH_2**	**UP CPMT-2011**
o-methoxy bromobenzene is treated with sodamide and then with NH_3. The product formed is– **m-methoxy aniline**	**UP CPMT-2011**
In the following reaction $C_6H_5COOCH_3 \xrightarrow[H_2O/H^+]{LiAlH_4}$ A + B A and B are respectively– **$C_6H_5CH_2OH+CH_3OH$**	**UP CPMT-2010**
Best process to synthesis $Me_3C–CN$ will be– **$Me_3C–MgBr$ is coupled with Cl–CN**	**Tripura JEE-2021** **WBJEE-2013**
Sodium formate on heating yields– **sodium oxalate and H_2**	**JIPMER-2011** **(AIPMT -1993)**
In a set of the given reactions, acetic acid yielded a product C. $CH_3COOH + PCl_5 \rightarrow A \xrightarrow[Anh.AlCl_3]{C_6H_6} B \xrightarrow[ether]{C_2H_5MgBr} C$ Product C would be– 	**JCECE-2008** **(AIPMT -2003)**
In a set of reaction acetic acid yielded a product D.   The structure of D would be–	**VITEEE-2011** **(AIPMT -2005)**
Reduction of aldehydes and ketones into hydrocarbons using zinc amalgam and conc. HCℓ is called– **Clemmensen reduction**	**(AIPMT -2007)**
The product formed in aldol condensation is– **a beta-hydroxy aldehyde or a beta-hydroxy ketone**	**(AIPMT -2007)**
The intermediate compound X in the following chemical reaction is 	**NEET 2021**
In the following reaction, the product (A) is–  Yellow dye 	**NEET-2014**
In the reaction	**NEET-2013**

Search on TG: @apna_pdf

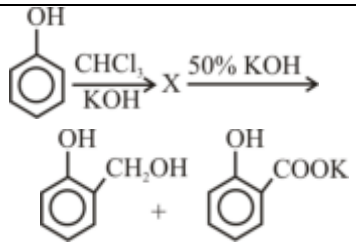
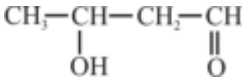
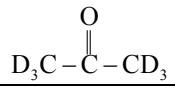
@apna_pdf

 A is– **$-H_3PO_2/H_2O$**	
In a set of reactions propionic acid yielded a compound D. $CH_3CH_2COOH \xrightarrow{SOCl_2} B \xrightarrow{NH_3} C \xrightarrow[Br_2]{KOH} D$ The structure of D would be– **$CH_3CH_2NH_2$**	**AIPMT -2006**
In a set of reactions m-bromobenzoic acid gave a product D. Identify the product  D.  –	**AIPMT-2011**
Hinsberg's reagent is– **benzene sulphonyl chloride**	**MHT CET-03.05.2019, SHIFT-I**
Carbolic acid is oxidised by acidified sodium dichromate to give– **benzoquinone**	**MHT CET-03.05.2019, SHIFT-I**
The reaction in which 2 molecules of chlorobenzene reacts with metallic sodium in presence of dry ether forming diphenyl is an example of,– **Wurtz- Fitting reaction**	**MHT CET-02.05.2019, SHIFT-II**
α-chlorosodium acetate on boiling with aqueous sodium nitrite gives– **nitromethane**	**MHT CET-02.05.2019, SHIFT-II**
Arenes on treatment with chlorine in presence of ferric chloride as a catalyst undergo– **Electrophilic substitution**	**MHT CET-2018**
Tert-butyl methyl ether on treatment with hydrogen iodide in cold gives– **tert-butyl iodide and methyl alcohol**	**MHT CET-2017**
The reagent is used in Etard reaction– **Chromyl chloride**	**MHT CET-2016**
The reagent used in Wolff-Kishner reduction is– **$NH_2 - NH_2$ and KOH in ethylene glycol**	**MHT CET-2016**
Glucose on oxidation with bromine water yields gluconic acid. This reaction confirms the presence of– **aldehyde group in glucose**	**MHT CET-2016**
Benzene can be conveniently converted into n-propyl benzene by– **Friedel-Craft acylation with propionyl chloride followed by Wolff-Kishner reduction**	**MHT CET-2014**
The reaction of sodium acetate and sodalime gives– **methane**	**MHT CET-2012**
2, 2-dichloropropane $\xrightarrow{\text{Aq.KOH}}$ A $\xrightarrow[\text{reduction}]{\text{Clemmensen}}$ B, B is– **propane**	**MHT CET-2011**
In Clemmensen's reduction, the catalyst used is– **Zn — Hg + Conc HCl**	**MHT CET-2010**
α-hydroxy propanoic acid has ..... asymmetric carbon atoms.– **1**	**MHT CET-2010**
CH_3COOH when reacts with C_2H_5OH gives a product. The same product is obtained by which reaction?– **Acetic anhydride + ethanol**	**MHT CET-2010**
In Dow's process, the starting raw material is– **chlorobenzene**	**MHT CET-2009**
In the following reaction sequence, Ethyl amine $\xrightarrow{HNO_2}$ A $\xrightarrow{PCl_5}$ B $\xrightarrow{NH_3}$ C the compound 'C' is– **$C_2H_5NH_2$**	**MHT CET-2009**
The alcohol that produces turbidity immediately with $ZnCl_2$/conc. HCl at room temperature– **2-hydroxy-2-methyl propane**	**MHT CET-2008**
The compound, which give a positive ninhydrin test and a negative Benedict's solution test, is– **a protein**	**MHT CET-2008**

TEAMSPY

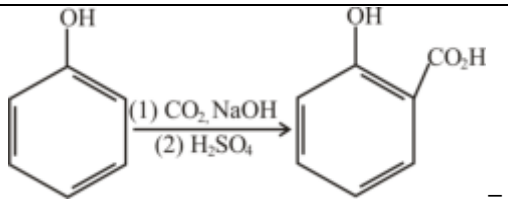
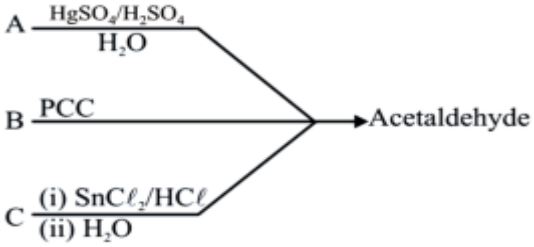
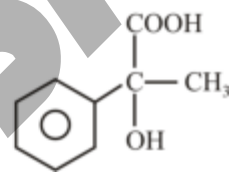
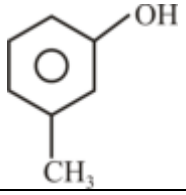
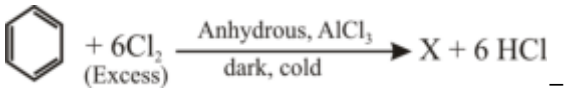
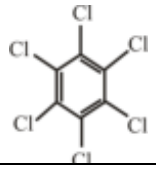
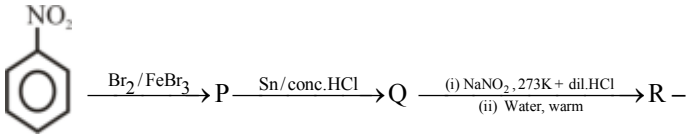
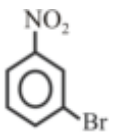
Search on TG: @apna_pdf

@apna_pdf

The final product of the following reaction is/are  _	**MHT CET-2008**
A mixture of ethyl amine and alcoholic KOH on heating gives– **ethyl isocyanide**	**MHT CET-2007**
The aldol condensation of CH_3-CHO results is the formation of– 	**MHT CET-2007**
In the reaction, $HCHO+CH_3MgI \rightarrow A \xrightarrow{H_2O} B+Mg(OH)I$ What are A and B? **CH_3CH_2OMgI and $CH_3–CH_2–OH$**	**Manipal-2019**
$CH_3COOH+NH_3 \rightarrow X \xrightarrow{\Delta} Y$; Y is : – **$CH_3CONH_2$**	**Manipal-2018**
$HCHO \xrightarrow{\text{Reduction}} A \xrightarrow{P \text{ and } I_2} B \xrightarrow{KCN} C \xrightarrow{\text{Hydrolysis}} D$. 'D' is : – **acetic acid**	**Manipal-2017**
$C_6H_5CH_2Cl \xrightarrow{\text{alc. } NH_3} A \xrightarrow{2CH_3Cl} B$ The product B is– **N, N-dimethyl phenyl methanamine**	**Kerala-CEE-29.08.2021**
$(CH_3)_3$ CMgCl on reaction with D_2O produces– **$(CH_3)_3CD$**	**Kerala-CEE-2009**
The alkyl halide that undergoes S_N1 reaction more readily is– **t-butyl bromide**	**Kerala-CEE-2009**
An organic compound with molecular formula C_6H_{12} upon ozonolysis gives only acetone as the product. The compound is– **2,3-dimethyl-2-butene**	**Kerala-CEE-2008**
Identify the product/s in the following reaction $3CH_3CH=CH_2 \xrightarrow{BH_3} X \xrightarrow{H_2O_2/OH^-} \text{Product/s} + H_3BO_3$ – **$CH_3CH_2CH_2OH$**	**Kerala-CEE-2007**
Identify the compound Z. In this reaction sequence $\mathbf{CH_3CH_2COOH \xrightarrow{NH_3} X \xrightarrow{Br_2+KOH} Y \xrightarrow{NHO_2} Z}$: _ **CH_3CH_2OH**	**Kerala-CEE-2006**
The enol form acetone after treatment with D_2O, gives:– 	**Kerala-CEE-2006**
Chlorination of toluene in presence of light and heat followed by treatment with aqueous NaOH gives :– **benzoic acid**	**Kerala-CEE-2005**
Ethanoic acid on heating with ammonia forms compound A which on treatment with bromine and sodium hydroxide gives compound B. Compound B on treatment with $NaNO_2$/dil. HCl gives compound C. The compounds A, B and C respectively are– **ethanamide, methanamine, methanol**	**Kerala-CEE-2012**
Gabriel's phthalimide synthesis can be used to prepare– **ethanamine**	**Kerala-CEE-2014**
The correct decreasing order of reactivity for a given alkyl (R) group in both S_N1 and S_N2 reaction mechanisms is– **R—I > R—Br > R—Cl > R—F**	**Kerala-CEE-2014**
The compound of molecular formula $C_5H_{10}O$ (A) reacts with Tollen's reagent to give silver mirror but does not undergo aldol condensation. The compound A is– **2, 2-dimethylpropanal**	**Kerala-CEE-2014**
When methanamine is treated with benzoyl chloride, the major product is– **N-methylbenzamide**	**Kerala-CEE-2015**
Predict the product (B) in the following sequence of reactions $\mathbf{\text{Ethyl benzene} \xrightarrow{KMnO_4/KOH} A \xrightarrow{H_3O^+} B}$ _ **Benzoic acid**	**Kerala-CEE-2016**

Search on TG: @apna_pdf

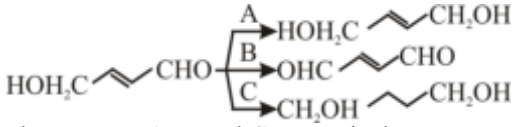
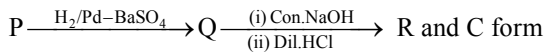
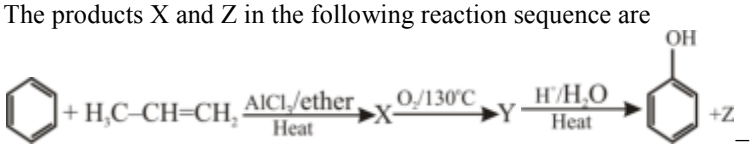
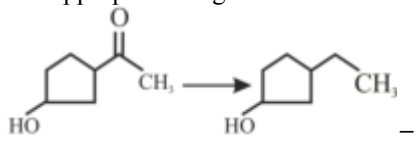
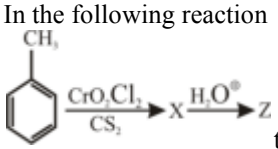
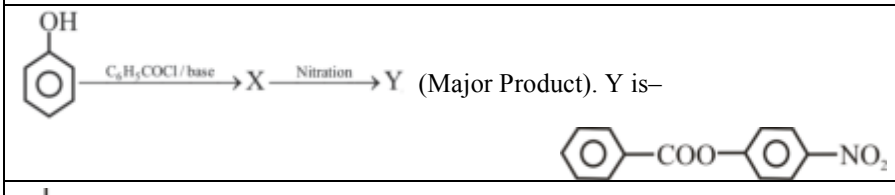
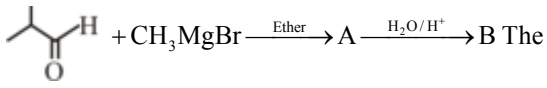
@apna_pdf

Name of the following reaction is  – **Kolbe-Schmith**	**Kerala-CEE-2017**
The compound that does not undergo hydrolysis by S_N1 mechanism is– **C_6H_5Cl**	**Kerala-CEE-2020**
The method by which aniline cannot be prepared is– **Potassium salt of phthalimide treated with chlorobenzene followed by the hydrolysis with aqueous NaOH solution**	**Kerala-CEE-29.08.2021**
The reagent which can do the conversion $CH_3COOH \rightarrow CH_3 — CH_2 — OH$ is– **$LiAlH_4$/ether**	**Kerala-CEE-29.08.2021**
 A, B and C respectively are– **ethyne, ethanol and ethane nitrile**	**Kerala-CEE-29.08.2021**
In set of reactions, identify D $CH_3COOH \xrightarrow{SOCl_2} A \xrightarrow[\text{Anhydrous } AlCl_3]{\text{Benzene}} B \xrightarrow{HCN}$  $C \xrightarrow{H_2O} D$	**Kerala-CEE-29.08.2021**
An organic compound 'X' on treatment with PCC in dichloromethane gives the compound Y. Compound 'Y' reacts with I_2 and alkali to form yellow precipitate of triiodomethane. The compound X is– **CH_3CH_2OH**	**Kerala-CEE-29.08.2021**
A compound 'A' (C_7H_8O) is insoluble in $NaHCO_3$ solution but dissolve in NaOH and gives a characteristic colour with neutral $FeCl_3$ solution. When treated with bromine water compound forms the compound B with the formula $C_7H_5OBr_3$. 'A' is– 	**Kerala-CEE-29.08.2021**
Identify 'X' in the following reaction.  – 	**Karnataka-CET-2020**
The carbonyl compound that does not undergo aldol condensation is– **trichloro acetaldehyde**	**Karnataka-CET-2020**
The final product for the reaction is  – 	**Karnataka-CET-2020**

TEAM SPY

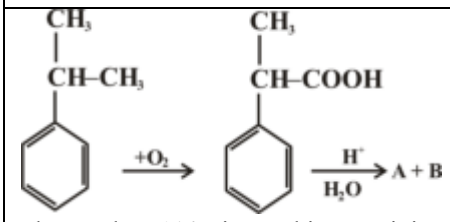
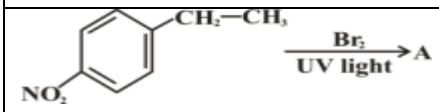
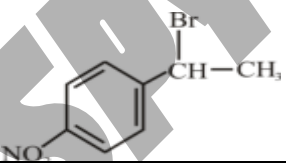
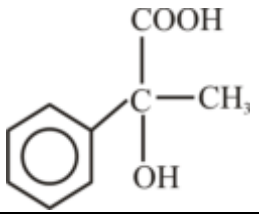
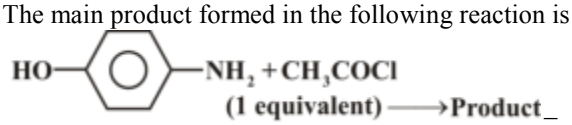
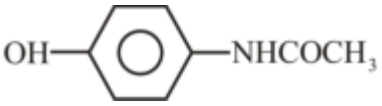
Search on TG: @apna_pdf

@apna_pdf

 The reagents A, B and C respectively are– **$NaBH_4$, PCC, H_2/Pd**	**Karnataka-CET-2019**
Propanoic acid undergoes HVZ reaction to give chloropropanoic acid. The product obtained is– **stronger acid than propanoic acid**	**Karnataka-CET-2019**
 R and C form benzyl benzoate when treated with each other, Hence P is– **C_6H_5COCl**	**Karnataka-CET-2019**
Tertiary alkyl halide is practically inert to substitution by S_N2 mechanism because of– **steric hindrance**	**Karnataka-CET-2018**
The products X and Z in the following reaction sequence are  – **isopropylbenzene and acetone**	**Karnataka-CET-2018**
The appropriate reagent for the following transformation is  – **$H_2N–NH_2$, KOH/ethylene glycol**	**Karnataka-CET-2018**
In the following reaction  the compound Z is– **benzaldehyde**	**Karnataka-CET-2018**
When the vapours of tertiary butyl alcohol are passed through heated copper at 573 K, the product formed is– **2-methyl propene**	**Karnataka-CET-2018**
In the following sequence of reactions $CH_3Br \xrightarrow{KCN} A \xrightarrow{H_3O^+} B \xrightarrow{LiAlH_4}$ The end product C is– **ethyl alcohol**	**Karnataka-CET-2017**
Cannizzaro's reaction is an example of auto oxidation– **It is a reaction answered by only aldehydes containing α-hydrogen**	**Karnataka-CET-2017**
In the following sequence of reactions, $A \xrightarrow{Reduction} B \xrightarrow{HNO_2} CH_3CH_2OH$ The compound A is– **ethane nitrile**	**Karnataka-CET-2016**
Benzene carbaldehyde is reached with conc. NaOH solution to give the products A and B. The product A can be used as a food preservative and the product B is an aromatic hydroxyl compound, where — OH group is linked to sp^3-hybridised C-atom next to benzene ring. The products A and B respectively are– **sodium benzoate and phenyl methanol**	**Karnataka-CET-2016**
The reaction which involves dichlorocarbene as an electrophile is– **Reimer-Tiemann reaction**	**Karnataka-CET-2016**
In the reaction, Ethanol $\xrightarrow{PCl_5} X \xrightarrow{alc.KOH} Y \xrightarrow[H_2O,\ \Delta]{H_2SO_4,\ room\ temp.} Z$ The product Z is–	**Karnataka-CET-2016**
 (Major Product). Y is–	**Karnataka-CET-2014**
 The IUPAC name of 'B' is– **3-methylbutan-2-ol**	**Karnataka-CET-2014**

Search on TG: @apna_pdf

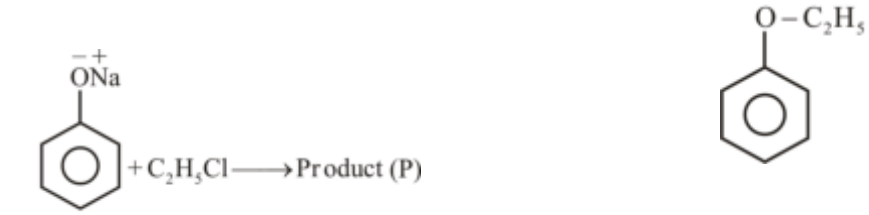
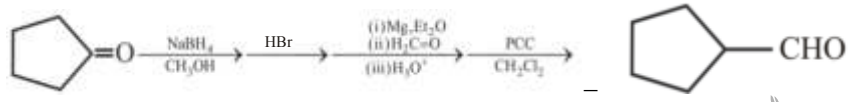
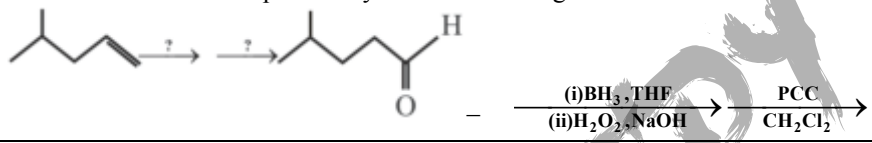
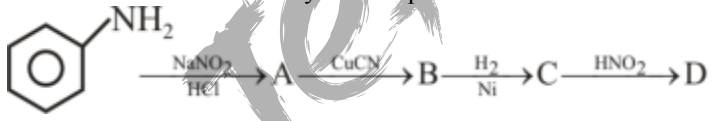
@apna_pdf

The correct sequence of reactions to convert p-nitrophenol into quinol involves– **reduction, diazotization and hydrolysis**	**Karnataka-CET, 2010**
$CH_3CH_2Br \xrightarrow[\Delta]{aq.KOH} A \xrightarrow[\Delta]{KMnO_4/H^+} B \xrightarrow[\Delta]{NH_3} C \xrightarrow[alkali]{Br_2} D$,'D' is _ **$CH_3NH_2$**	**Karnataka-CET, 2010**
$CH_3COOH \xrightarrow{LiAlH_4} X \xrightarrow[300^oC]{Cu} Y \xrightarrow[NaOH]{Dilute} Z$ In the above reaction Z is– **aldol**	**Karnataka-CET, 2009**
Anisole can be prepared by the action of methyl iodide on sodium phenate. The reaction is called– **Williamson's reaction**	**Karnataka-CET, 2008**
 The product 'A' gives white precipitate when treated with bromine water. The product 'B' is treated with barium hydroxide to give the product C. The product D is– **4-methylpent-3-en-2-one**	**Karnataka-CET-2021**
 The compound A (major product) is– 	**Karnataka-CET-2021**
$C_6H_5CH_2Cl \xrightarrow{Alc.NH_3} A \xrightarrow{2CH_3Cl} B$. The product B is– **N, N–dimethylephenylemethanamine**	**Karnataka-CET-2021**
The reagent which can do the conversion $CH_3COOH \longrightarrow CH_3-CH_2-OH$ is – **$LiAlH_4$/ether**	**Karnataka-CET-2021**
$CH_3CHO \xrightarrow[(ii)\,H_3O^+]{(i)\,CH_3MgBr} A \xrightarrow[\Delta]{Conc.H_2SO_4} B \xrightarrow[(ii)\,H_2O,OH^-]{(i)\,B_2H_6} C$ A and C are– **Position isomers**	**Karnataka-CET-2021**
In set of reactions, identify D $CH_3COOH \xrightarrow{SOCl_2}$  $A \xrightarrow[Anhy.AlCl_3]{Benzene} B \xrightarrow{HCN} C \xrightarrow{H_2O} D$ –	**Karnataka-CET-2021** **JIPMER-2007** **J&K CET-1999**
Decomposition of benzene diazonium chloride by using Cu_2Cl_2/HCl to from chlorobenzene is– **Sandmeyer's reaction**	**Karnataka-CET-2007**
Hoffmann's bromamide reaction is to convert– **amide to amine**	**Karnataka-CET-2007**
The main product formed in the following reaction is  **(1 equivalent) ⟶ Product** _ 	**JIPMER-2017**

TEAM SPY

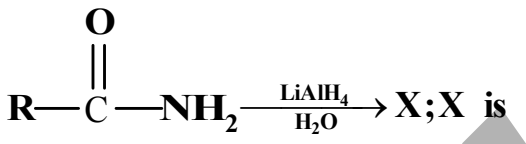
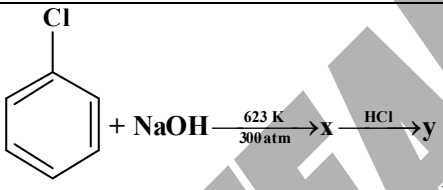
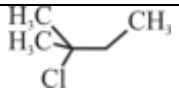
Search on TG: @apna_pdf

@apna_pdf

 The product (P) is	JIPMER-2017
Iso-propyl chloride + A $\xrightarrow{\Delta}$ 2-ethoxy propane + NaCl. The compound (A) is– **C_2H_5ONa**	JIPMER-2017
Phenol $\xrightarrow[(ii)CO_2/140°C]{(i)NaOH}$ **A** $\xrightarrow{H^+/H_2O}$ B $\xrightarrow{Ac_2O}$ C In the above reaction, end product 'C' is– **aspirin**	JIPMER-2017 JCECE - 2014
The product in given sequence of reactions 	JIPMER-2015
The suitable reaction steps to carry out the following transformation is 	JIPMER-2015
Clemmensen reduction of a ketone is carried out in the presence of - **Zn-Hg with HCl**	JIPMER-2014
$CH_3COOH \xrightarrow{Br_2/P} Y \xrightarrow[(ii)H_3O^+]{(i)KCN} X$ Here, X is– **malonic acid**	JIPMER-2012
The reaction, $C_6H_5CHO + CH_3COOC_2H_5 \rightarrow C_6H_5CH = CHCOOC_2H_5$, is called– **Claisen condensation**	JIPMER-2009 UP CPMT-2008
A fruity smell is produced by the reaction of C_2H_5OH with– **CH_3COOH**	JIPMER-2008
When dihydroxy acetone reacts with HIO_4, the product is/are– **HCHO and CO_2**	JIPMER-2008
Electrolytic reduction of nitrobenzene in weakly acidic medium gives– **N-phenylhydroxylamine**	JIPMER-2007
Aniline in a set of reactions yielded a product D.  The structure of the product D would be– **$C_6H_5CH_2OH$**	JIPMER-2007
In Williamson's synthesis, ethoxyethane is prepared by– **Heating sodium ethoxide with ethyl bromide**	JIPMER-2006
Phenol and benzoic acid are distinguished by– **$NaHCO_3$**	JIPMER-2005
$CH \equiv CH \xrightarrow[H_2O]{Hg^{2+}/H^+} A \xrightarrow{LiAlH_4} B \xrightarrow{P/Br_2} C$. Final product C is– **$CH_3–CH_2–I$**	JIPMER-2019
Glucose $\xrightarrow{HCN}$ **X** $\xrightarrow{Hydrolysis}$ **Y** $\xrightarrow{Red\ P+HI}$ **Z** IUPAC name of Y and Z– **Hepta hydroxyl hexanoic acid, heptane**	JIPMER-2019
$CH_2 = CH – CHO \xrightarrow{?} CH_2 = CH – CH_2 – OH$ Suitable reagent for conversion of following reaction?– **$NaBH_4$**	JIPMER-2019
Phenol is treated with Zn to form:– **benzene**	JCECE - 2006
Isocyanide is prepared by:– **Carbylamine reaction**	JCECE - 2009, 2006
If calcium acetate and calcium formate react, then product formed is:– **acetaldehyde**	JCECE - 2006
The reaction between aniline and nitrous acid at low temperature yields– **diazonium salt**	JCECE - 2008
The compound formed on heating chlorobenzene with chloral in the presence of	JCECE - 2008

Search on TG: @apna_pdf

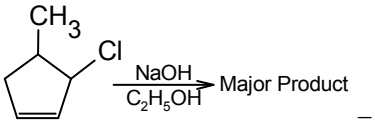
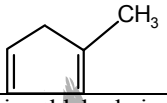
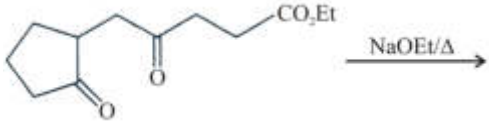
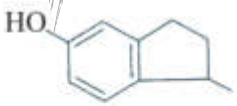
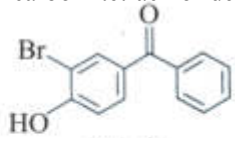
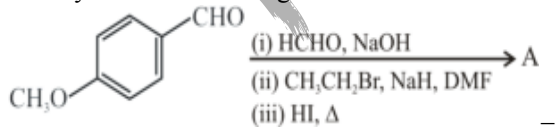
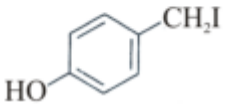
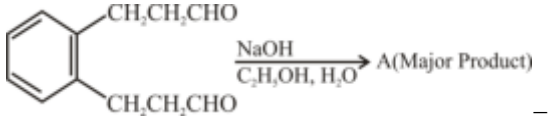
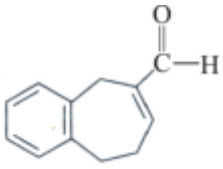
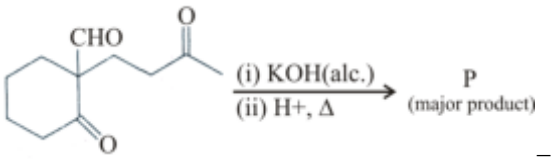
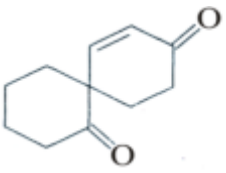
@apna_pdf

concentrated sulphuric acid is– **DDT**	
When $CH_2 = CH—COOH$ is reduced with $LiAlH_4$, the compound obtained will be– **CH_2=CH—CH_2OH**	**JCECE – 2008**
Acetic anhydride reacts with diethyl ether in the presence of anhydrous $AlCl_3$ to give– **$CH_3COOC_2H_5$**	**JCECE - 2010**
The most reactive compound towards formation of cyanohydrin on treatment with HCN followed by acidification is– **p-nitrobenzaldehyde**	**JCECE - 2010**
Benzene on treatment with a mixture of conc. HNO_3 and conc. H_2SO_4 at 100°C gives– **m-dinitrobenzene**	**JCECE - 2010**
The hydrolysis of 2-bromo-3-methyl butane by S_N1 mechanism gives mainly– **2-methyl-2-butanol**	**JCECE - 2012**
In the reaction, $CH_3COOH \xrightarrow{LiAlH_4} A \xrightarrow{PCl_5} B \xrightarrow{Alc.KOH} C$ The product is– **ethylene**	**JCECE - 2015**
Anisole can be prepared by the action of methyl iodide on sodium phenate. The reaction is called– **Williamson's reaction**	**JCECE - 2017**
$4HCl + O_2 \rightarrow 2Cl_2 + 2H_2O$. Catalyst used in this reaction is– **$CuCl_2$**	**JCECE - 2018**
Hinsberg's reagent is– **$C_6H_5SO_2Cl$**	**Karnataka-CET-2020, JCECE - 2018**
Reagent used in carbylamine reaction– **$CHCl_3$ + KOH**	**JCECE - 2018**
Ethanal undergoes a reaction in the presence of alkali to give 3-hydroxy butanal. The reaction is– **Aldol condensation**	**JCECE - 2018**
 **amine**	**JCECE - 2018**
$RCN + SnCl_2 + HCl \xrightarrow{H_3O^+} RCHO$ Name of the reaction is– **Stephen reaction**	**JCECE - 2018**
 **Phenol**	**JCECE - 2018**
In the preparation of Grignard reagent, the medium used is– **ether**	**JCECE - 2018**
The product of reaction between aniline acetic anhydride is– **acetanilide**	**J&K CET-(2012)**
A nucleophilic substitution reaction proceeds through S_N1 mechanism, So, the reaction is– **unimolecular**	**J & K CET-(2012)**
When $(CH_3)_3CCH_2Cl$ is heated at 300^0C, it gives– 	**J & K CET-(2015)**
Treatment of aniline with bromine water produces– **2, 4, 6- tribromoaniline**	**J & K CET-(2013)**
$C_6H_5COCl \xrightarrow{NH_3} X \xrightarrow{P_2O_5} Y \xrightarrow[H_2]{Ni} Z$ The end product in the above sequence of reactions is– **benzyl amine**	**J & K CET-(2013)**
Propanal on reaction with lithium aluminium hydride gives– **1-propanol**	**J & K CET-(2013)**
Chlorobenzene can be prepared by reacting aniline with– **nitrous acid followed by heating with cuprous chloride.**	**J & K CET-(2013)**
Mendius reaction converts an alkyl cyanide to– **a primary amine**	**J & K CET-2011, 2003, 2002**
Electrolytic reduction of nitrobenzene in strongly acidic medium gives the product– **p-Aminophenol**	**J & K CET-(2009)**
Aliphatic nitriles are prepared by the treatment of alkyl halides with– **Sodium cyanide**	**J & K CET-(2007)**
KCN reacts readily to give a cyanide with– **ethyl bromide**	**J & K CET-(2005)**

TEAM SPY

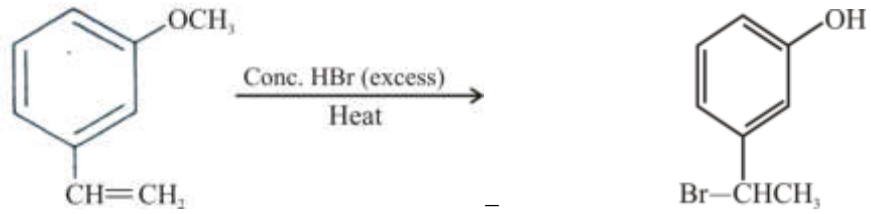
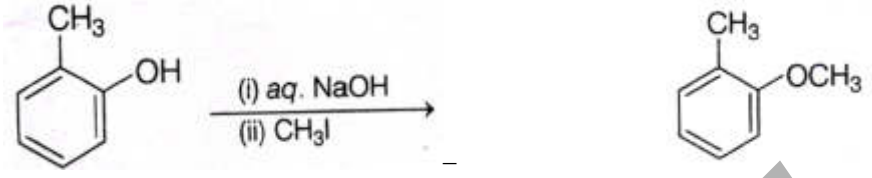
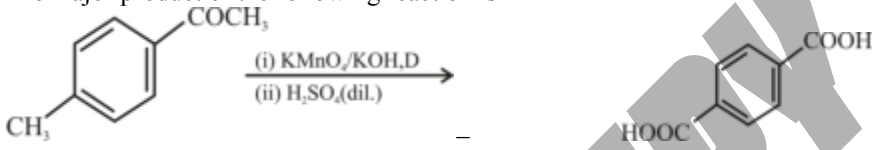
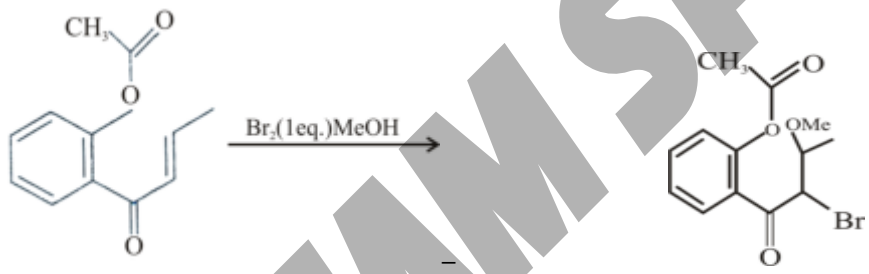
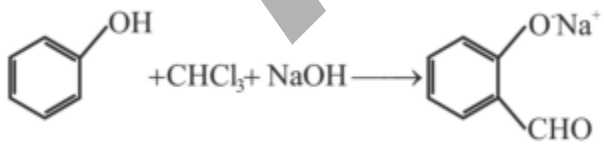
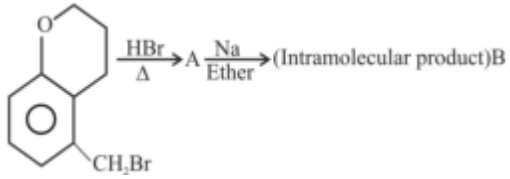
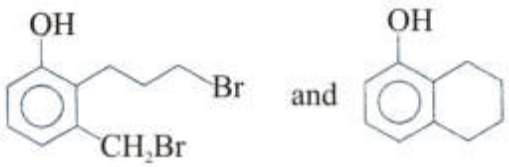
Search on TG: @apna_pdf

@apna_pdf

Formation of methyl tertiary butyl ether by the reaction of sodium tertiary butoxide and methyl bromide involves– **nucleophilic substitution reaction**	**J & K CET-(2010)**
On reaction with hydroxyl amine, aldehydes produce– **aldoxime**	**J & K CET-(2007)**
Phenol on heating with alcoholic KOH and chloroform undergoes– **Reimer-Tiemann reaction**	**J & K CET-(2011)**
Chloroform on heating with silver powder gives– **ethyne**	**J & K CET-(2011)**
$CH_3Br + OH \rightarrow CH_3OH+Br$, this reaction proceeds by S_N2-mechanism. Its rate is dependent on the concentration of– **CH_3Br, OH**	**J & K CET-(2006)**
The compound which contains all the four 1°, 2°, 3°, and 4° carbon atoms is– **3-chloro-2,3-dimethylpentane**	**J & K CET-(2005)**
Dehydration of alcohol is an example of which type of reaction?– **elimination**	**J & K CET-(2008)**
The major product of the following reaction is:  –  	**[JEE Main-2021, 31 Aug Shift-II]**
Ozonolysis of an organic compound A produces acetone and propionaldehyde in equimolar mixture. Identify A- **2-methyl-2-pentene**	**(AIEEE 2011)**
The major product obtained in the following reaction is  – 	**(JEE Main-2019, 10 Jan Shift-II)**
The major product of the following reaction is –  	**(JEE Main-2019, 11 Jan Shift-II)**
p-hydroxybenzophenone upon reaction with bromine in carbon tetrachloride gives–  	**(JEE Main-2019, 9 April Shift-II)**
Identify A in the following chemical reaction.  –  	**(JEE Main-2021, 26 Feb Shift-II)**
Identify A in the given chemical reaction  –  	**(JEE Main-2021, 26 Feb Shift-II)**
The major product P in the following reaction is  –  	**(JEE Main-2021, 20 July Shift-II)**

Search on TG: @apna_pdf

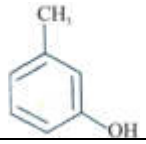
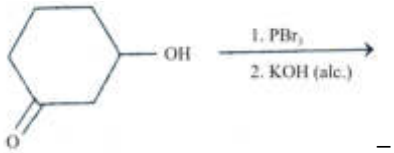
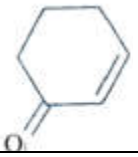
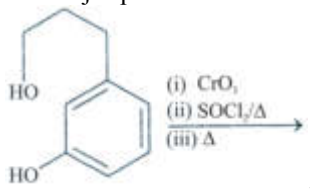
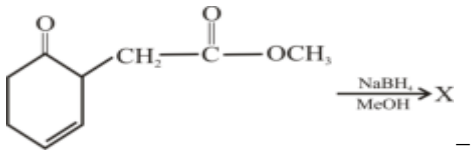
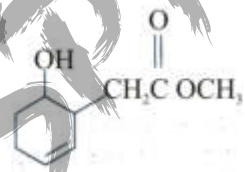
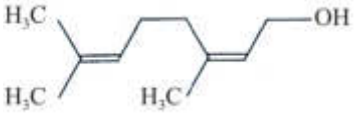
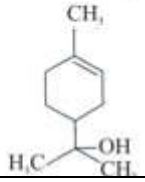
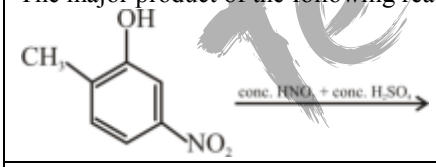
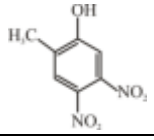
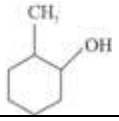
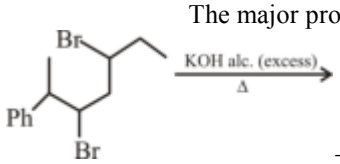
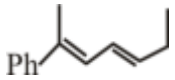
@apna_pdf

R - CN $\xrightarrow[(ii)H_2O]{(i)DIBAL-H}$ R - Y Consider the above reaction and identify Y.– **–CHO**	**(JEE Main-2021, 27 July Shift-II)**
The major product of the following reaction is  –	**(JEE Main-2019, 8 April Shift-I)**
The major product of the following reaction is  –	**(JEE Main-2019, 10 Jan Shift-II)**
The major product of the following reaction is  –	**(JEE Main-2019, 11 Jan Shift-I)**
The major product obtained in the following conversion is  –	**(JEE Main-2019, 11 Jan Shift-II)**
The major product formed in the following reaction is –	**(JEE Main 2018)**
 The electrophile involved in the above reaction is– **dichlorocarbene ($:CCl_2$)**	**AIEEE-2008**
In the following reaction sequence, structures of A and B; respectively will be  – 	**(JEE Main-2020, 7 Jan Shift-II)**

TEAM SPY

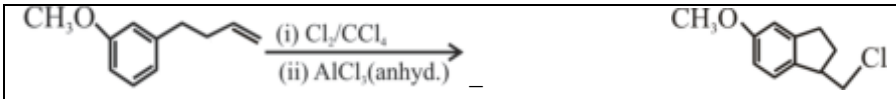
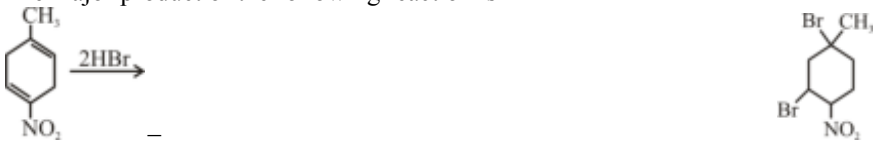
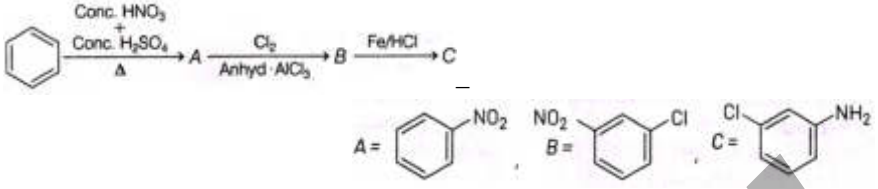
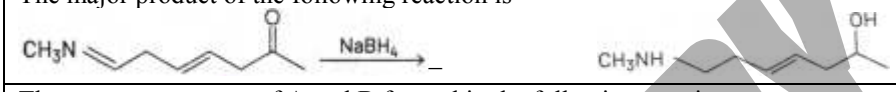
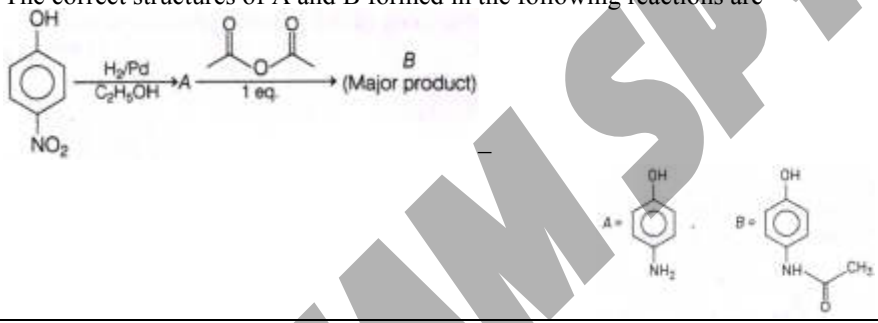
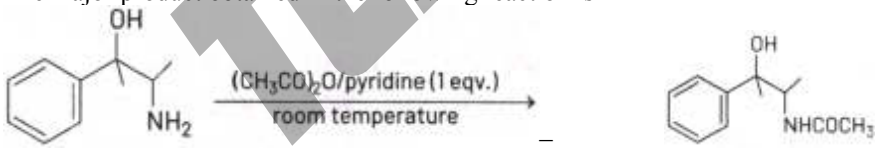
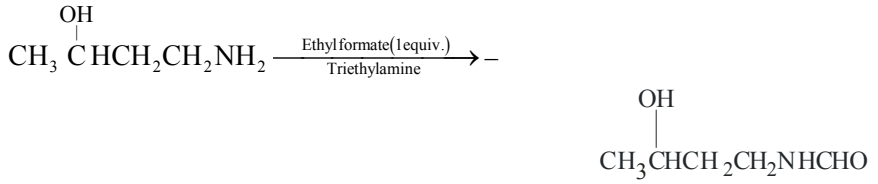
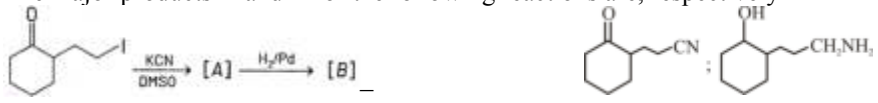
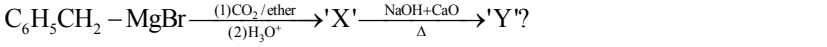
Search on TG: @apna_pdf

@apna_pdf

The structure of the compound that gives a tribromo derivative on treatment with bromine water is– 	**(AIEEE 2006)**
The major product of the following reaction is  – 	**(JEE Main-2019, 9 April Shift-I)**
The major product of the following reaction is  –	**(JEE Main-2019, 12 April Shift-I)**
The major product 'X' formed in the following reaction is  – 	**(JEE Main-2019, 10 Jan Shift-I)**
The major product of the following reaction is  – 	**(JEE Main-2020, 8 Jan. Shift-I)**
The major product of the following reaction  	**(JEE Main-2020, 2 Sept. Shift-II)**
Consider the above reaction and identify the product (P).– 	**(JEE Main-2021, 27 July Shift-I)**
The major product of the following reaction is:  – 	**[JEE Main-2019, 10 Jan Shift-I]**
The major product of the following reaction is:	**[JEE Main-2019, 12 Jan Shift-I]**

Search on TG: @apna_pdf

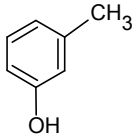
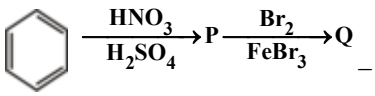
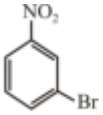
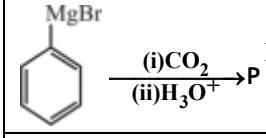
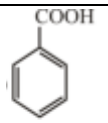
@apna_pdf

	
Benzene on nitration gives nitrobenzene in presence of HNO_3 and H_2SO_4 mixture, where:– **HNO_3 acts as a base and H_2SO_4 acts as an acid**	**[JEE Main-2021, 20 July Shift-II]**
The major product of the following reaction is 	**[JEE Main 2020, 6 Sep Shift-I]**
Identify correct A, B and C in the reaction sequence given below. 	**JEE Main 2021, 31 Aug Shift-II**
The major product of the following reaction is 	**JEE Main 2019, 10 Jan Shift-I**
The correct structures of A and B formed in the following reactions are 	**JEE Main 2021, 27 Aug Shift-II**
Reaction of cyclohexanone with dimethylamine in the presence of catalytic amount of an acid forms a compound. Water during the reaction is continuously removed. The compound formed is generally known as– **an enamine**	**AIEEE 2005**
The major product obtained in the following reaction is 	**JEE Main 2019, 9 Jan Shift-II**
The major product of the following reaction is 	**JEE Main 2019, 10 April Shift-I**
The major products A and B for the following reactions are, respectively 	**JEE Main 2019, 9 April Shift-II**
 What is the final product in this reaction?– **$C_6H_5CH_3$**	**GUJCET-2020**
Which products are obtained when phenyl ethanoate reacts in presence of Anh.$AlCl_3$?– **o-Hydroxy acetophenone and p-Hydroxy Acetophenone**	**GUJCET-2017**

TEAM SPY

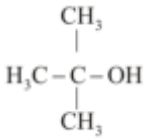
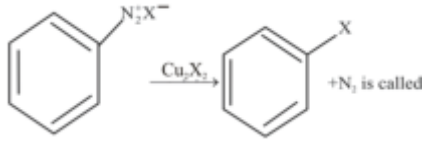
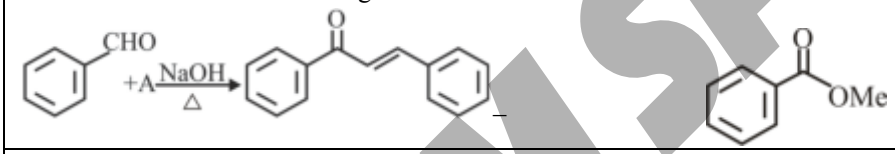
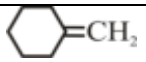
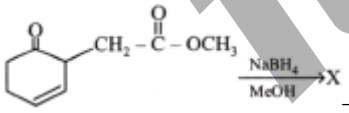
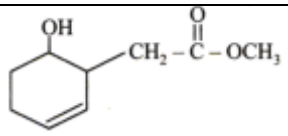
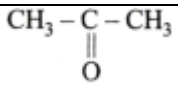
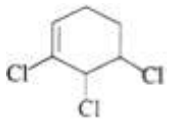
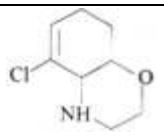
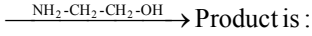
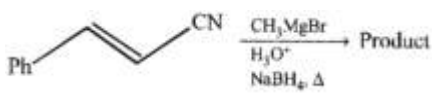
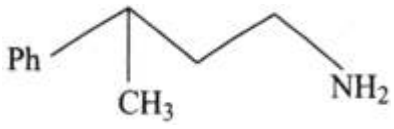
Search on TG: @apna_pdf

@apna_pdf

Benzoyl chloride + Sodium benzoate $\xrightarrow{\Delta}$ _____.– **Benzoic anhydride**	**GUJCET-2019**
Name the reaction $CH_3CH_2Cl + NaI \xrightarrow{\text{acetone}} CH_3CH_2I + NaCl$ – **Frinkel-stein reaction**	**GUJCET-2016**
CO_2 acts as electrophile in which reaction?– **Kolbe reaction**	**CG PET- 2013**
Reduction of methyl isocyanide gives– **dimethylamine**	**CG PET -2006**
The reaction $CH_2{=}CH_2 + H_2 \xrightarrow[250-300^\circ]{Ni} CH_3 - CH_3$ is called– **Sabatier-Senderens reaction**	**CG PET -2006**
Base catalysed aldol condensation occurs with– **2- methyl propionaldehyde**	**CG PET- 2010**
When esters are hydrolysed the product gives hydrogen ions. The product which gives hydrogen ion is– **acid**	**[BITSAT-2009]**
The preparation of ethyl acetoacetate involves:– **Claisen condensation**	**[BITSAT-2012]**
Schotten-Baumann reaction is a reaction of phenols with– **benzoyl chloride and sodium hydroxide.**	**[BITSAT-2011] AIPMT -1994**
Nucleophilic addition reaction will be most favoured in– **CH_3CHO**	**[BITSAT-2013]**
An organic compound is treated with $NaNO_2$ and dil. HCl at 0^oC. The resulting solution is added to an alkaline solution of β-naphthol where by a brilliant red dye is produced. It shows the presence of– **aromatic $-NH_2$ group**	**[BITSAT-2007] AIEEE-2011**
$CH_3NO_2 \xrightarrow[HCl]{SnCl_2} CH_3X$, 'X' is:– **$-NH_2$**	**[BITSAT-2007]**
Aniline reacts with nitrous acid to produce– **benzene diazonium chloride**	**[BITSAT-2011]**
Aniline reacts with phosgene and KOH to form–	**[BITSAT-2014]**
An alkyl halide by formation of its Grignard reagent and heating with water yields propane. What is the original alkyl halide?– **Propyl bromide**	**BCECE-2008**
$PhCH_2CH_3 \xrightarrow[(ii)H_3O^+]{(1)CrO_2Cl_2/CCl_4} PhCH_2CHO$ The above reaction is an example of - **Etard reduction**	**BCECE-2015**
A nitrogenous substance A is treated with HNO_2 and the product formed is further treated with NaOH solution which produces blue colouration. Then, A will be– **$(CH_3)_2CHNO_2$**	**BCECE-2015**
The structure of the compound that gives a tribromo derivative on treatment with bromine water is– 	**Assam CEE-2014 AIEEE-2006**
$CH_3 - CH = CH - CH_2 - CN \xrightarrow[H_2O]{DIBAL-H}$ – **$CH_3 - CH = CH - CH_2 - CHO$**	**Assam CEE-2020**
The compound Q in the following reaction is  	**AMU-2019**
 In the above reaction, product P is– 	**AMU-2019**
Sodium hydroxide is manufactured by– **Castner-Kellner process**	**AMU-2017**

Search on TG: @apna_pdf

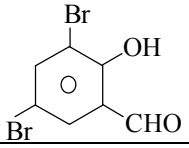
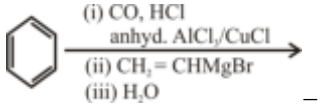
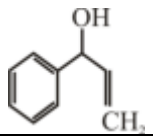
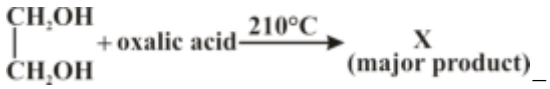
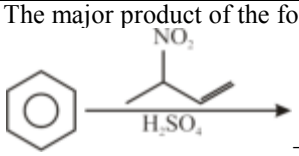
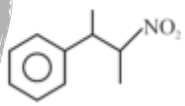
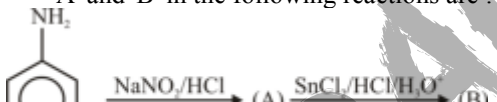
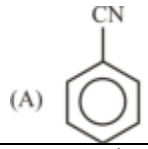
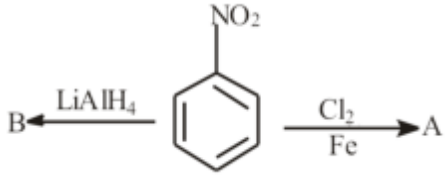
@apna_pdf

The following reaction, $R - X + NaI \rightarrow R - I + NaX$ where, X = Cl, Br is known as– **Finkelstein reaction**	**AMU-2017**
 The fastest dehydration reaction could be expected in–	**AMU-2017**
The reaction,  – **Sandmeyer's reaction**	**AMU-2017**
The reaction, $R - NH_2 + CHCl_3 + 3KOH \xrightarrow{heat} R - NC + 3KCl + 3H_2O$ is known as– **Carbylamine reaction**	**AMU-2015**
When Friedel-Crafts alkylation of benzene is carried out with n-propyl bromide, the major product is– **isopropyl benzene**	**TS EAMCET-05.08.2021, Shift I** **AMU-2011**
Cumene $\xrightarrow[(ii)\ H_2O,H^+]{(i)\ O_2}$ (X) and(Y) (X) and (Y) respectively are– **phenol and acetone**	**AMU-2011**
The reactant 'A' in the following reaction is  –	**AMU-2010**
The most reactive compound towards electrophilic nitration is– **toluene**	**AMU-2009, [BITSAT-2007]**
Thermal decomposition of gives– 	**AMU-2009**
In Reimer-Tiemann reaction, the electrophile formed during the reaction is– **$:CCl_2$**	**AMU-2006**
The reaction of zinc with dilute and concentrated nitric acid, respectively, produces:– **N_2O and NO_2**	**AIIMS-25.05.2019 (Evening)**
 – 	**AIIMS-26.05.2019 (Evening)**
$CH_3 - C \equiv CH \xrightarrow{2HBr} A \xrightarrow{H_2O} B$, B is :_ 	**AIIMS-26.05.2019 (Evening)**
 –   Product is :	**AIIMS-25.05.2019 (Morning)**
The product of the given reaction  is– 	**AIIMS-25.05.2019 (Morning)**
$CH_3 - CH = CH - CH = N - CH_3 \xrightarrow{LiAlH_4}$ What is final product?– **$CH_3 - CH = CH - CH_2 - NH - CH_3$**	**[AIIMS-26 May, 2018 (M)]**
Nitrobenzene undergoes reduction with Zn/alc. KOH to form a compound A.	**AP-EAMCET (Medical),**

TEAM SPY

Search on TG: @apna_pdf

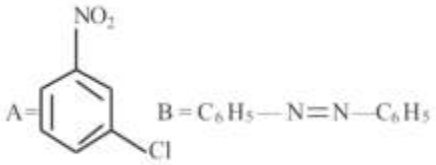
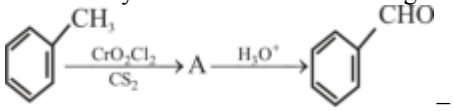
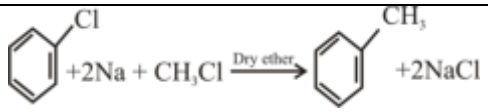
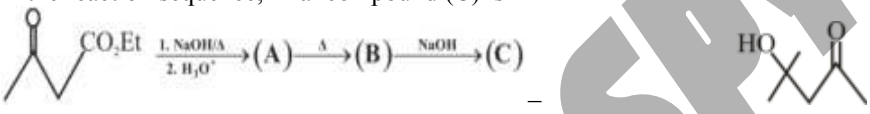
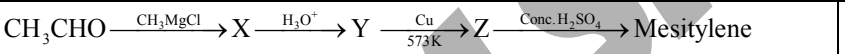
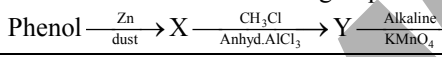
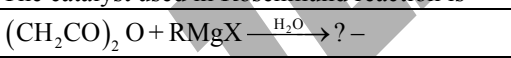
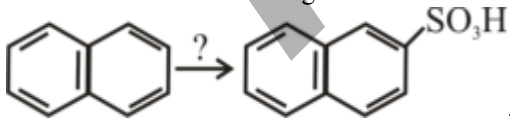
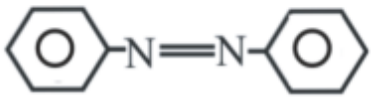
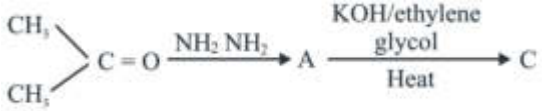
@apna_pdf

The number of sigma and pi bonds in A, respectively, are– **27, 6**	**2008**
Chlorobenzene $\xrightarrow[X]{\text{Reaction}}$ Phenol $\xrightarrow[Y]{\text{Reaction}}$ Salicylaldehyde. X and Y reactions are respectively.– **Dow and Reimer Tiemann.**	**GUJCET-2011**
The major product formed when salicylaldehyde is reacted with 2 equivalents of bromine in glacial acetic at a 0°C– 	**TS-EAMCET (Engg.), 06.08.2021**
The Swarts reaction yields– **Fluorohydrocarbons**	**TS-EAMCET (Engg.), 06.08.2021**
The major product of the following reaction sequence is  	**TS EAMCET-05.08.2021, Shift-I**
What is 'X' in the given reaction ? 	**JEE Main-25.02.2021, Shift-II**
The correct sequence of reagents used in the preparation of 4-bromo-2-nitroethyl benzene from benzene is :– **$CH_3COCl/AlCl_3$, Zn - Hg/HCl, $/Br_2/AlBr_3$, HNO_3/H_2SO_4**	**JEE Main-25.02.2021, Shift-II**
The major product of the following reaction is:  	**JEE Main-25.02.2021, Shift-II**
'A' and 'B' in the following reactions are :  	**JEE Main-24.02.2021, Shift-I**
Primary, secondary and tertiary amines can be separated using:– **para-Toluene sulphonyl chloride**	**JEE Main 17.03.2021, Shift-II**
The oxidation of toluene to benzaldehyde by chromyl chloride is called– **Etard reaction**	**COMEDK-2019**
The reagent with which both acetaldehyde and acetone readily react is– **Grignard reagent**	**COMEDK-2020**
Reaction of ethyl formate with excess of PhMgBr followed by hydrolysis gives.– **Diphenyl methanol**	**SCRA - 2009**
Identify A and B in the following reactions 	**AP EAMCET (Engg.) 2012**

Search on TG: @apna_pdf

@apna_pdf

These ebooks are free of cost, Join our telegram channel: @apna_pdf

	
The reagent used in the Wolff-Kishner reduction is– **$H_2N–NH_2/KOH$**	**AP-EAMCET- (Engg.)-2011**
Yellow dye can be prepared by a coupling reaction of benzene diazonium chloride in acidic medium with – **Aniline**	**AP-EAMCET – 2016**
Identify the name of the following reaction.  – **Etard Reaction**	**AP-EAMCET – 2016**
 This reaction is known as– **Wurtz-Fitting reaction**	**AP-EAMCET – 2016**
The product formed when $(CH_3)_3C-OC_2H_5$ reacts with HI are– **Ethyl alcohol and tert- butyl iodide**	**AP- EAPCET- 07-09-2021, Shift-I**
In the reaction sequence, final compound (C) is  –	**SRMJEEE -2008**
 Identify the substance 'Y'.– **2-Propanol**	**SRMJEEE – 2013**
The reaction between C_2H_5Br and KCN is —— type.– **S_N2**	**SRMJEEE – 2016**
What is Z in the following sequence of reactions?  – **Benzoic acid**	**AIPMT-2009**
Cannizaro reaction is given by– **HCHO**	**VITEEE- 2008**
Anisole is the product obtained from phenol by the reaction known as– **etherification**	**VITEEE- 2008**
Aldol condensation is given by– **acetaldehyde**	**VITEEE- 2007**
The catalyst used in Rosenmund reaction is– **$Pd/BaSO_4$**	**VITEEE- 2007**
 – **$RCOCH_2CH_2COOH$**	**VITEEE- 2007**
The conditions that can bring about the following transformation -  – **conc. H_2SO_4, 160^0C**	**SCRA-2014**
Chlorobenzene is prepared commercially by:– **Raschig process**	**MPPET-2013**
The reaction between acetic acid and ammonia gives– **CH_3COONH_4**	**TS-EAMCET (Engg.), 07.08.2021 Shift-II**
The structure of the compound formed, when nitrobenzene is reduced by lithium aluminium hydride ($LiAlH_4$) is– 	**AP EAMCET-2008**
The compound prepared by a substitution reaction of benzene is– **acetophenone**	**AP-EAMCET-2005**
The end product (C) of the reaction is  – **$CH_3—CH_2—CH_3$**	**Jharkhand – 2019**

LEAM SPY

Search on TG: @apna_pdf

@apna_pdf